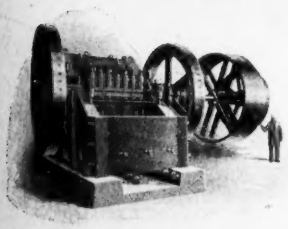
Pit and Quarry

SAND ▪ GRAVEL ▪ STONE

HANDLING ▪ CRUSHING ▪ SCREENING ▪ WASHING

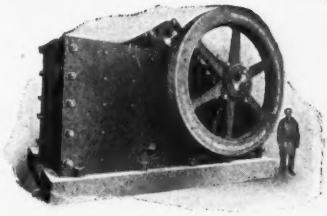
BUCHANAN JAW CRUSHERS

ALL STEEL — PATENTED



REAR VIEW

This Type "C" Buchanan All-Steel Rock and Ore Crusher



FRONT VIEW

has crushed more than 5,000,000 (Five Million) tons of hard trap rock without rebabbitting.

The entire construction excepting the fly wheels is of the very best quality of Open Hearth Steel, heat-treated and annealed.

Pitman is parting, spring-balanced and water-jacketed. Frame bearings also water-jacketed. All joints subjected to strain are machined.

All BUCHANAN crushers are furnished with our patent adjustable jaw stroke.

Manganese Steel jaw plates, cheek plates and toggle bearings made reversible for maximum service.

Wide range of sizes up to 66x84 in. Bulletins and recommendations on request.

C. G. Buchanan Company, Inc.

West Street Building
New York City

SEPTEMBER, 1920

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Table of Contents - - - - Page 43
Power Plants Section - - Page 133

SPECIFY S-A CONVEYORS

Highly Important Feature

The means whereby the aggregate is transferred to the washing and screening plant is most important. No better method is available than the belt conveyor. Steadily and continuously the belt conveyor delivers material in a uniform flow to the screens.

S-A belt conveyors are particularly desirable for this service. They are thoroughly reliable and require minimum attention.

If you contemplate building a new plant or if you anticipate changes or extensions to your present equipment, communicate with S-A engineers.

STEPHENS-ADAMSON MFG. CO.
AURORA, ILLINOIS

"Repairs for a year, less than $15.00"

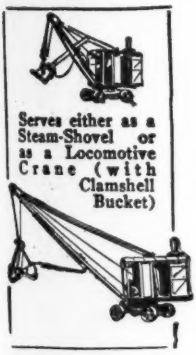
"We have worked our ERIE SHOVEL for more than a year, and our expenses for repairs have been less than $15.00.

"We have three different makes of shovels, and think more of the ERIE than of the other makes. Anyone needing a shovel will make no mistake in buying an ERIE." *WIGGIM CRUSHED STONE & SAND CO., Germantown, Ohio.*

If you want to find out which is the best revolving shovel on the market, just ask the Wiggim Crushed Stone Company, or any other ERIE owner.

Write for a copy of our Bulletin "Q." Address:

BALL ENGINE CO., Erie, Pa.
Builders of ERIE Steam Shovels and Locomotive Cranes, BALL *Engines*



ERIE Revolving Shovels BALL Engine Co. Erie, Pa.

Speedy and Economical DRILLING is the "WONDER" in the

Hardsocg WONDER DRILL

Self-rotating and automatically oiled. Piston hammer don't hit from end of cylinder—unbreakable.

Equipped with exhaust control, shock absorber and full rubber handle.

Air controlled by one lever handle valve. So few parts, upkeep is negligible, so simple that unskilled labor can operate successfully

Write today for catalog.

Agencies in all principal cities.

Hardsocg Wonder Drill Co.

Ottumwa, Iowa

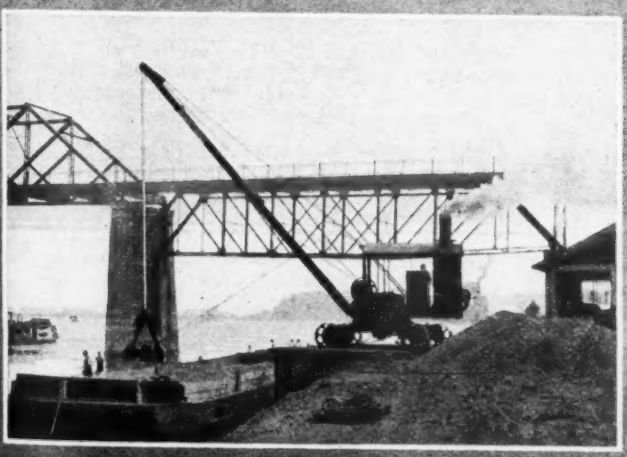
Little Giant Road Crane

SAND, GRAVEL, CRUSHED STONE

Are all alike in this respect, that they are economically handled by the LITTLE GIANT ROAD CRANE. Every handling operation of these materials is an opportunity for profit, provided you will install a LITTLE GIANT ROAD CRANE on the job.

Numerous operators testify as to the profitable possibilities of the LITTLE GIANT ROAD CRANE. Its minimum expense for upkeep, its freedom from repairs, and its low cost of operation have been proved conclusively by the test of time in both pit and quarry.

Address Dept. C.



The Locomotive Crane Company
OF AMERICA
CHAMPAIGN · ILLINOIS

Easton cars stand up under overloads, careless treatment and the elements alike, to the full satisfaction of the boss who wants to make a good showing, and the gang which is trying to make a record clean-up.

Easton cars work right because they're designed by engineers who know from twenty-five years' experience what is needed in a car. They work long because they're made of good material by capable workmen. They save money because they fit the job.

Furnishing the right kind of a car is only part of Easton Service. All the rest of an industrial railway's equipment—track, switches, turntables and small parts—are included in Easton facilities.

Let our engineers help you. Their advice is competent—and free.

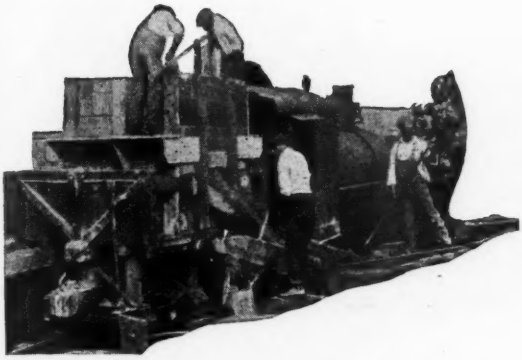
EASTON CAR & CONS'T'N CO.

Church and Dey Streets, New York

Works: Easton, Pa.

New York Boston Pittsburgh
Detroit Chicago Philadelphia

2070B



Hauling Capacity

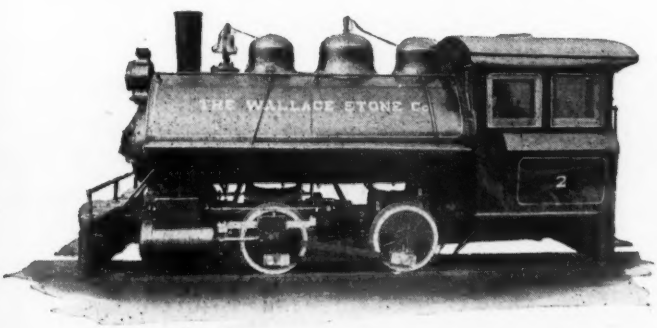
Used on the construction of state road, this very light, 7x12, saddle tank locomotive operates over **very** uneven portable track, on 20-lb. rails. It starts 21 loaded cars on a total of 63 tons on curves of 30 feet radius on grades of 2% and 2½%.

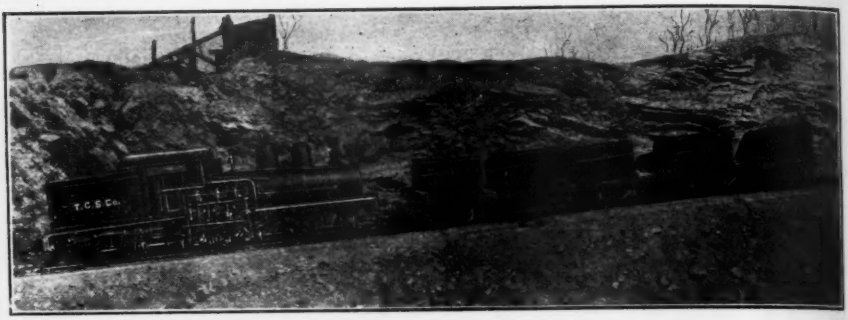
It hauled 232 tons every day for eight months, an average of 42 miles per working day of eight hours. Its regular daily performance was 134.1% efficient. Another typical VULCAN record.

VULCAN IRON WORKS

Locomotive Designers and Builders

1754 Main St., Wilkes-Barre, Pa.





"Shay" Locomotive in Quarry Service.

Cost Reducers

"Shay" engines reduce switching costs.

They attain speed in 22% less time than a rod engine.

They spot cars 11% quicker.

They are easier and cheaper to maintain than a rod engine—every part is a "one man" part and can be easily adjusted by one man without special tools.

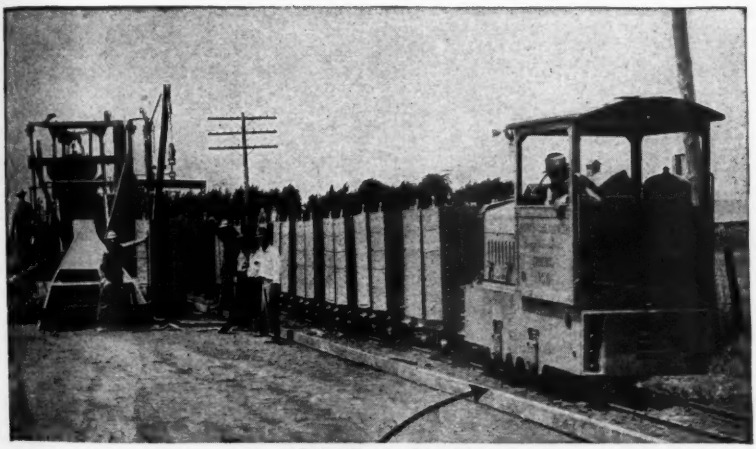
Write us for records of "Shay" performance

Lima Locomotive Works, Incorporated
LIMA, OHIO

New York Office, 30 Church St.

WHITCOMB LOCOMOTIVES

ALL SIZES
FOR ALL CONDITIONS
POSITIVE GEAR AND FRICTION DRIVE
GASOLINE AND STORAGE BATTERY



SIX TON

3-Speed Positive Drive

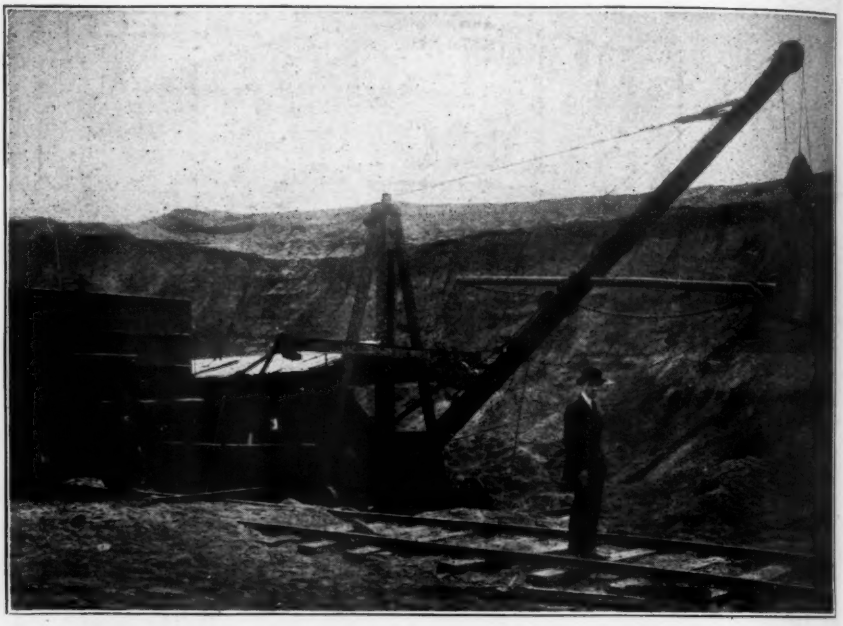
Road Contractors Special

This Six-Ton Gasoline Locomotive Will High Ball More Material to the Mixer Than Any Other Gasoline Locomotive Built of Its Weight.

Gasoline Locomotives, 2½ to 25 Tons. Storage Battery Locomotives, 2 to 8 Tons on Drivewheels.

GEO. D. WHITCOMB CO.

ROCHELLE **ILLINOIS**



"Very Satisfactory"

is what Holbrook & Skinner say of

The BAY CITY LOADER

For Pit and Quarry Service

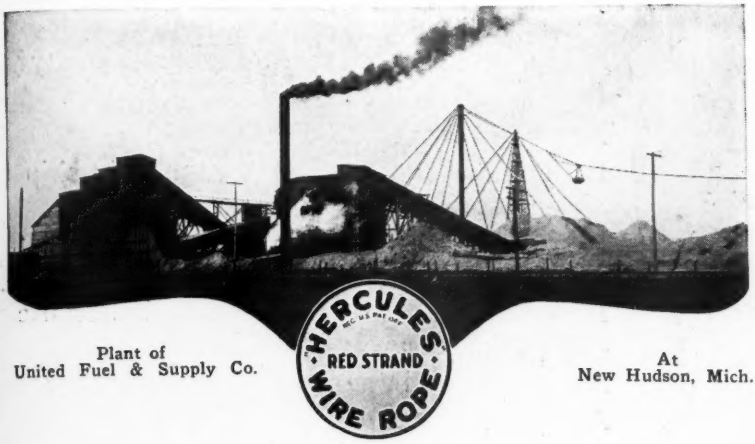
This machine is in operation loading gravel at their plant in Lansing, Mich. It is rendering excellent service and Mr. Skinner most willingly said so.

The BAY CITY Loader operates a powerful digging bucket that takes a big load at every bite. Handles a large amount of material at very low cost. Can be used for stripping, grading and loading sand, gravel or clay from bank into cars or wagons. Operating and upkeep costs small.

Write for full description.

BAY CITY DREDGE WORKS

BAY CITY - - - - MICH.



Plant of
United Fuel & Supply Co.

At
New Hudson, Mich.

ITS DEPENDABILITY HAS BEEN DEMONSTRATED

When you put on a Hercules (Red-Strand) Wire Rope you are not experimenting, for its ability to work successfully on sand and gravel handling machinery of all kinds has been fully demonstrated by actual service.

Whether you operate a small plant or a large one, HERCULES Wire Rope will help you reduce your operating cost. Its one red-strand is our guarantee of quality.

Catalog gladly furnished.

Established 1857

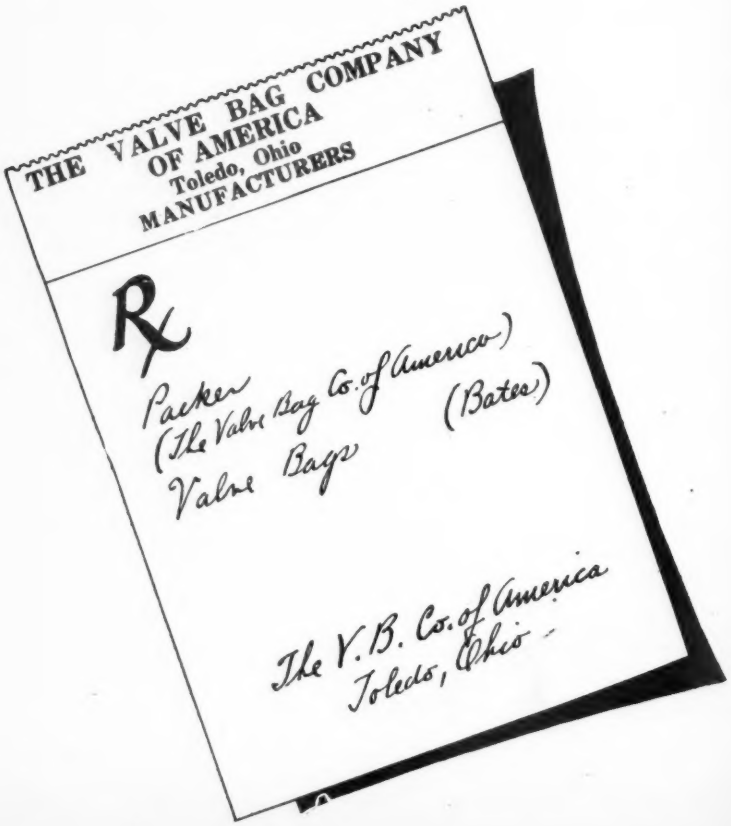
A. LESCHEN & SONS ROPE CO.

ST. LOUIS, MO.

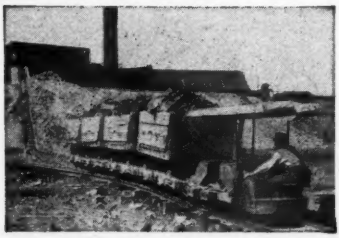
New York Chicago Denver San Francisco

Pack Lime Efficiently!

Are your shipments below your capacity?
Is your pay-roll excessive?
Are your workmen dissatisfied?
Do you suffer losses by breakage in shipment?
Do you lose material by your present method of packing?
Is your storage space wasted because packages are not uniform?
Are your goods unattractive in package?
Are your customers dissatisfied?
Are your stockholders dissatisfied?
Is your business lagging?



How Do You Move Your Cars?



Do you know what it is costing you to move your materials by your present methods?

—Figure it carefully

Do you know what savings can be made by a correctly applied system of electrical haulage?

—We will show you

Do you know the safety, speed, economy and high capacity of a good electric haulage system?

—We can tell you

Wouldn't you like a thorough analysis of your conditions, to see how they may be improved?

—We will make it

Wouldn't you like expert engineering advice as to selection of just the right equipment?

—Yours without obligation

Do you know that there is available to you from our varied line an exactly suitable system?

—Let us prove it

Do you know how our Service follows our every installation, to assure you perfect satisfaction?

—It's an important point

Wouldn't you like to see something of our complete line as shown in our Industrial Bulletin?

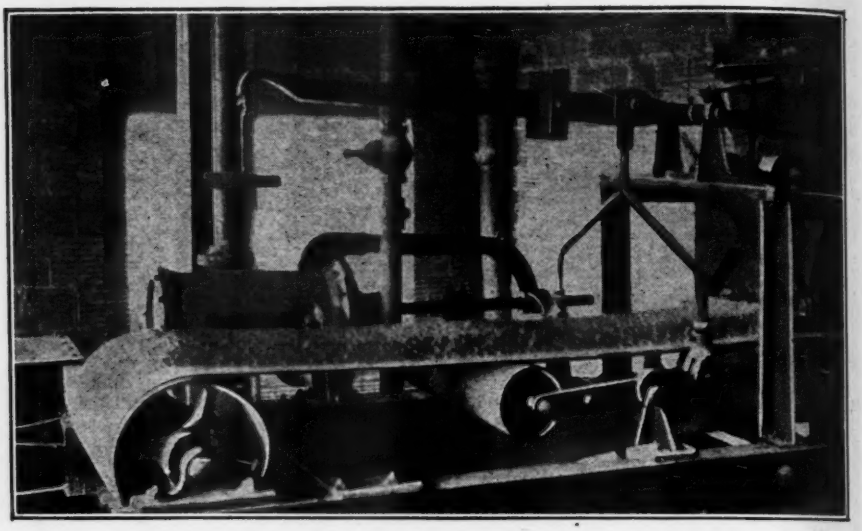
—Ask for Book No. 201-Q

GOODMAN MANUFACTURING CO.

48th to 49th Streets, on Halsted

Chicago, Illinois

(85)



Successful Cement Manufacturers Use The SCHAFFER Poidometer

BECAUSE

It handles materials AUTOMATICALLY, doing the work of correctly proportioning by weight; adding proper proportions of liquid in wet process; operating with 99.50 per cent accuracy; keeps tab on production and wastage.

This outfit will handle a wide variety of materials, such as ground quick lime, limestone, hydrate lime, ground shales, coal, coke, ores, sawdust, zinc, fire clays, manganese, litharge, white lead, etc.

Can you afford to be without one?

The Schaffer Engineering & Equipment Co.

Peoples Bank Building **Pittsburgh, Pa.**

ALLIS-CHALMERS DUST COLLECTORS

Have you a dust Problem?

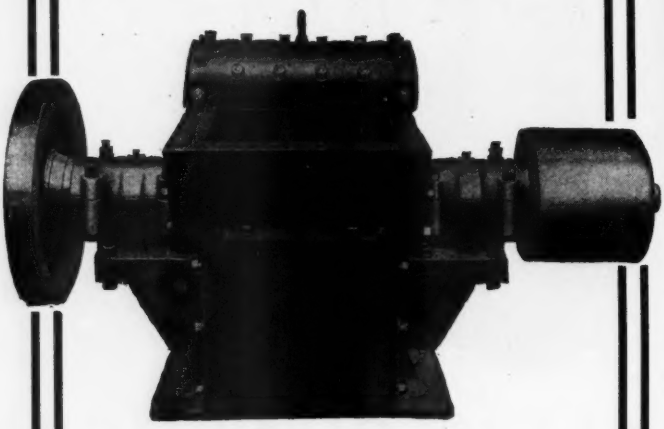
If so, it will be to your advantage to let us study the conditions in your plant. We design and equip dust collecting systems to meet your particular conditions.

Write for Bulletin 1454

ALLIS-CHALMERS

Milwaukee. Wis.. U. S. A.

The Powerful Hercules Crusher



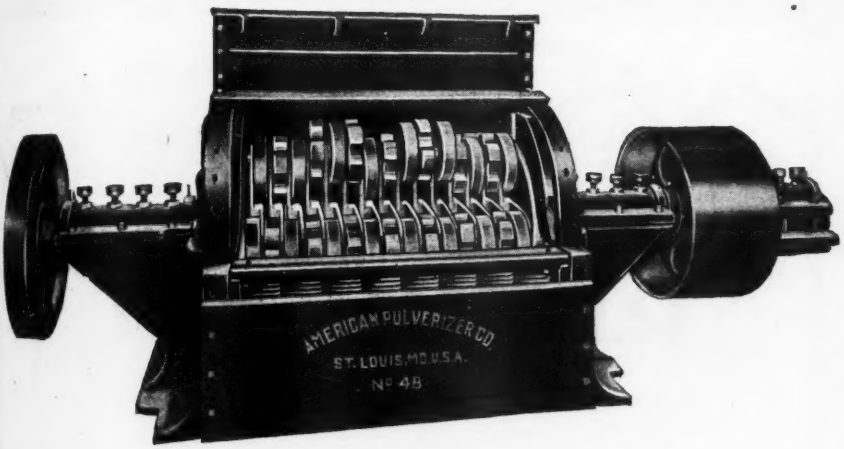
The Gruendler Hammer Mill

Is a powerful force created to crush limestone and other material and to lower maintenance costs at every quarry where it is used. Its massive hammers reduce the material in one operation, from a 10-inch thickness to the fineness of 2 inches, 1½ iches and under. From base to bolts it is of the staunchest construction, steady and smooth running. A saving of 40% in power consumption and 90% in lubrication makes this machine the most economical for all quarry operations.

Capacity 30 tons to 300 tons per hour. Built stationary or portable. Write to us for particulars.

GRUENDLER PATENT CRUSHER & PULVERIZER CO.

905 North Main St. St. Louis, Mo.



LIMESTONE for the Farmer

The demand among farmers for this product far exceeds the supply. Soil fertility is measured by the abundance or lack of lime. The farmer of today knows that he must keep up the lime on his land. He is a steady buyer of pulverized limestone. An initial application of four tons per acre followed by subsequent applcations of two tons every four years will keep a steady market for your product. An AMERICAN RING PULVERIZER will pay for itself within a few months.

Greater Tonnage Lower Operating Cost

Every quarry should make plans to supply limestone. There is a continual demand for it, and with an AMERICAN RING PULVERIZER installed in your plant you can supply it at far less cost per ton. Ours is the only ring Rotary Pulverizer that utilizes centrifugal force at right angles to the horizontal shaft, consequently requires less power to operate. Our No. 48 pulverizer (illustrated above) will crush from 4½ to 6 tons of limestone per hour.

Numerous tests have shown that the AMERICAN RING PULVERIZER will produce limestone for from ten to fifteen cents per ton. Our Catalog No. 53 will supply data and proof that our claims are not excessive.

American Pulverizer Company
18th and Austin Sts. St. Louis, Mo.

AMERICAN Ring Pulverizers

REDUCTION
MACHINERY

Gyratory and Jaw Crushers for Initial Breakers.

Symons Horizontal Disc Crushers as Intermediate Breakers.

Symons Vertical Disc Crushers as Intermediate or Finishing Crushers.

Ball Mills and Tube Mills for Finish Grinding

Crushing Rolls as Intermediate Crushers.

Pulsating and Revolving Screens.

Whether it be one machine or a complete plant we want the opportunity of figuring with you.

Our engineers are at your service in the design of your plant and are in a position to go into the smallest detail of the arrangement of your reduction equipment.

Our Machinery Now In Use In

Vermont
Connecticut
Massachusetts
New York
Pennsylvania
New Jersey
Maryland
Ohio
Indiana
Illinois
Michigan
Wisconsin
Rhode Island
Virginia
Kentucky
Tennessee
Alabama
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Missouri
Iowa
Minnesota
North Dakota
South Dakota
Nebraska
Kansas
Oklahoma
Texas
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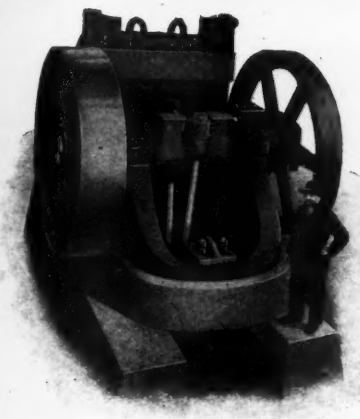
CHALMERS & WILLIAMS

Main Office, 1430 Arnold Street, Chicago Heights, Illinois
Chicago Office, 208 S. La Salle St.



Look Your Jaw Crusher In The Back!

If it's a

Traylor "Bulldog"

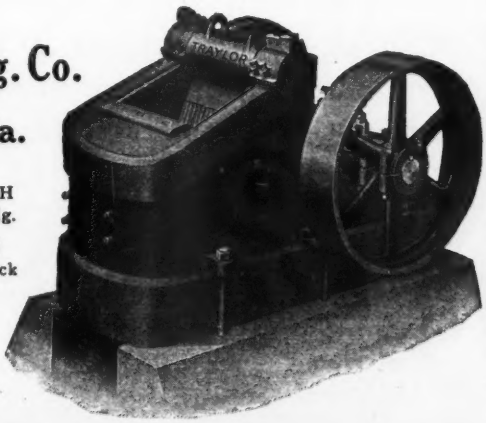
You'll see what's going on inside—what it is that eliminates 80% of the friction load and makes the "Bulldogs" the strongest, most economical, and most reliable jaw crushers on the market.

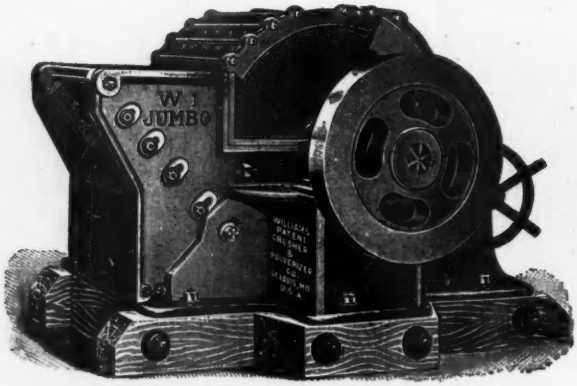
A lighter but far stronger pitman—a frictionless, self-aligning toggle system—a steel-banded frame of unequalled strength—these and other economy-producing "Bulldog" features are fully described in Bulletin QJX-1. Send for it.

Traylor Eng. & Mfg. Co.

Allentown, Pa.

NEW YORK 30 Church St.
PITTSBURGH 211 Fulton Bldg.
CHICAGO 1414 Fisher Bldg.
SPOKANE Mohawk Block
LOS ANGELES Citizens Bank Bldg.





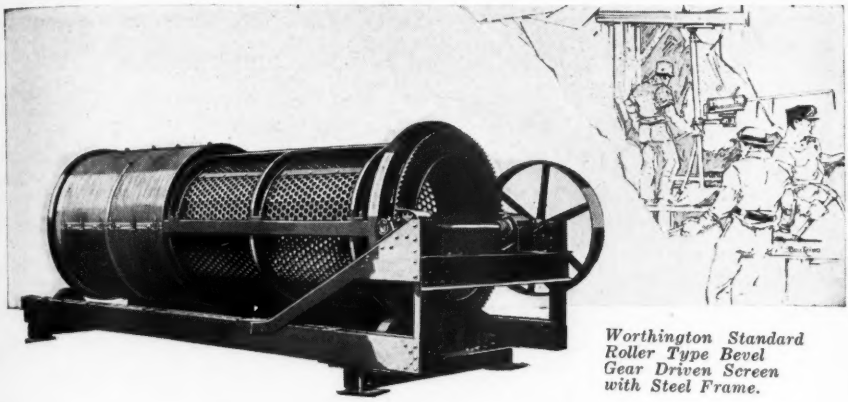
WILLIAMS JUMBO CRUSHERS

Williams Jumbo Crushers are used in quarries as secondary crushers, taking 10-inch and under limestone, as it comes from the primary crushers, and reducing the material to 1½-inch, 1¼-inch or 1-inch and under in one operation. These machines are built in capacities ranging from 30 tons to 300 tons per hour. Many are now in operation. Complete details concerning these crushers are found in bulletin No. 85-A.

The Williams Patent Crusher & Pulverizer Company
General Sales Dept., 37 W. Van Buren St.,
CHICAGO

Plant
ST. LOUIS

67 Second St.
SAN FRANCISCO



Worthington Standard Roller Type Bevel Gear Driven Screen with Steel Frame.

What Worthington have to offer you

See our exhibit at the Sixth National Exposition of Chemical Industries,

Grand Central Palace, New York

Week of September 20th.

SINCE proper selection and installation of machinery determine plant efficiency, Worthington maintain at their Power and Mining Works, Cudahy, Wis., a corps of engineering experts for your advice and help.

As companion apparatus to the Screen illustrated at the head of this page, Worthington build Superior McCully Gyratory Crushers, Superior Jaw Crushers, Rotary Kilns, Dryers, Coolers, Elevators, Tube Mills and Ball Compartment Mills. Many of these machines incorporate particular Worthington construction features as for instance, Superior McCully suspended short shaft and force-feed lubrication.

Then, too, sponsoring these machines is the great, big Worthington organization since 1840 world's standard for pumps and pumping machinery.

Other Worthington Products

Gyratory Crushers, Jaw Crushers, Air Compressors, Mine Pumps, Revolving Stone Screens, Ball and Tube Mills.

Worthington Pump and Machinery Corporation
Executive Offices: **115 Broadway, New York City**
Branch Offices in 24 Large Cities.

PUMPS—COMPRESSORS—CONDENSERS—OIL & GAS ENGINES—METERS—MINING—ROCK CRUSHING & CEMENT MACHINERY

WORTHINGTON

Deane Works, *Holyoke, Mass.*
Blake & Knowles Works
East Cambridge, Mass.
Worthington Works
Harrison, N. J.
Laidlaw Works, *Cincinnati, Ohio.*

Hazleton Works, *Hazleton, Pa.*

Gas Engine Works, *Cudahy, Wis.*
Power & Mining Works
Cudahy, Wis.
Snow-Holly Works
Buffalo, N. Y.
Epping-Carpenter, *Pittsburgh, Pa.*

A new Screen revolutionize pu

The Mitchell Electric Vibrating Screen is the invention of B. A. Mitchell, chief mechanical engineer of the Utah Copper Company. After two years' successful operation in one of the world's largest concentrating mills, it has been developed to the highest degree of efficiency ever attained by a screening device.

The Electric Vibrating Unit, the distinguishing characteristic of the Mitchell, is designed on principles which, as applied to screening are revolutionary. **It forces the meshes up into the material 3,600 times a minute with an impact of 500 to 1,000 pounds. The movement of the meshes of the screen is in a**

minute, cr ath and jarring or g of the

The Mitchel e used f crystalline ular ma or dry. It cularly w ing of sand el and o ucts.

The Mitch traordin consumptio e instal livering a l produc tons per 2 of min 3 H. P.

Write us for the illustrated booklet de g the

MITCHEL

ELECTRIC VIBRATING SCE

STIMPSON EQUIPMEN

318 Felt Building

Manufactur sole

VIBRATING ELECTRICALLY that will pur screening

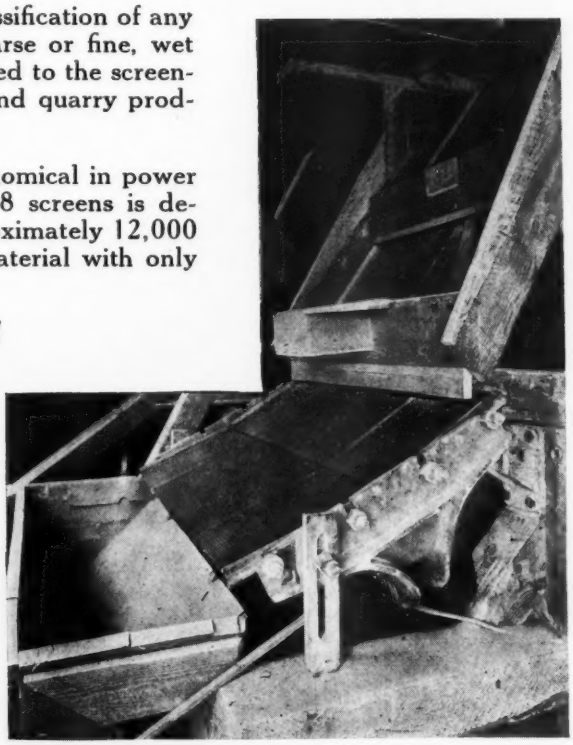
ath and causes not the slightest of the mechanism.

Mitchell Screen in Plant of Wisconsin Granite Co., Sioux Falls, S. D.

e used for the classification of any ular material, coarse or fine, wet cularly well adapted to the screen- el and other pit and quarry prod-

traordinarily economical in power ne installation of 8 screens is de- product of approximately 12,000 of minus ½" material with only

g the Mitchell



EL

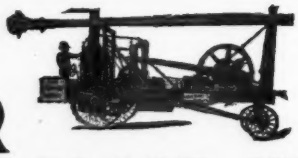
SCEEN

UIPMENT COMPANY

sole agents

Salt Lake City

THE CLIPPER



BLAST HOLE DRILL

The fact that the "CLIPPER" BLAST HOLE DRILL is used by the largest and best buyers of such machinery in the world is better proof of superiority than all the "big claim" advertisements that can be written in a month!

Among our hundreds of large customers, many of whom have bought from TEN to SEVENTEEN machines from us, we are proud to name the following:

If all these big concerns use the "CLIPPER" why not You?

Kelley Island Lime & Transport Co.
Mich. Limestone & Chemical Co.
Michigan Alkali Co.
France Stone Co.
Brownell Improvement Co.
Standard Lime & Stone Co.
Solvay Process Co.
Bethlehem Steel Co.
Jones & Laughlin Steel Co.
Lackawanna Steel Co.
Blair Limestone Co.
The Lehigh, The Alpha, The Atlas
The Alsen, The Coplay, The Vulcanite
The Whitehall, The LaSalle, and
The South-Western Portland Cement Companies
General Crushed Stone Co.
Tomkins Cove Stone Co.
Bessemer Limestone Co.
National Lime & Stone Co.
Greenville Stone & Gravel Co.
Lee Lime Co.
Ladd Lime & Stone Co.
A. T. Small Quarries Co.
W. W. Boxley Co.
Canada Cement Co.
Cornwall Ore Bank Co.
Connecticut Lime Co.
Dominion Mines & Quarries Co.
Ford Plate Glass Co.
Owens-Bottle Machine Co.
Toledo Stone & Glass Sand Co.
Derry Glass Sand Co.
Wayne Coal Co.
Adena Coal Co.
Danville Brick Co.
Lake Shore Shale Brick Co.

And hundreds of others of greater or less magnitude.

They are made for Steam, Gasoline, Compressed Air or Electric Power

The Loomis Machine Co.

TIFFIN, OHIO

TELSMITH—

FOR CRUSHING GRAVEL BOULDERS

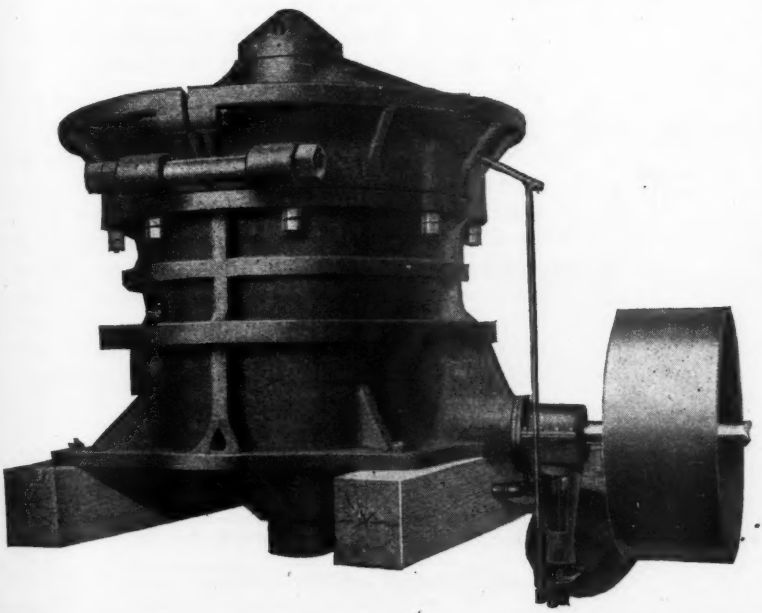
Have you ever stood over a Telsmith Primary Breaker crushing hard gravel boulders? They get only one pinch apiece —and that goes for the big, black, shiny fellows too. They don't slip; and they don't jump. If they did, you wouldn't linger near the crusher very long. But the Telsmith heads GYRATES HORIZONTALLY, the stroke being the same length at the top of the bowl as at the bottom. Smooth, water-washed boulders are gripped solidly—cracked—crushed—discharged—all without any fuss or frolic—all just in the day's work.

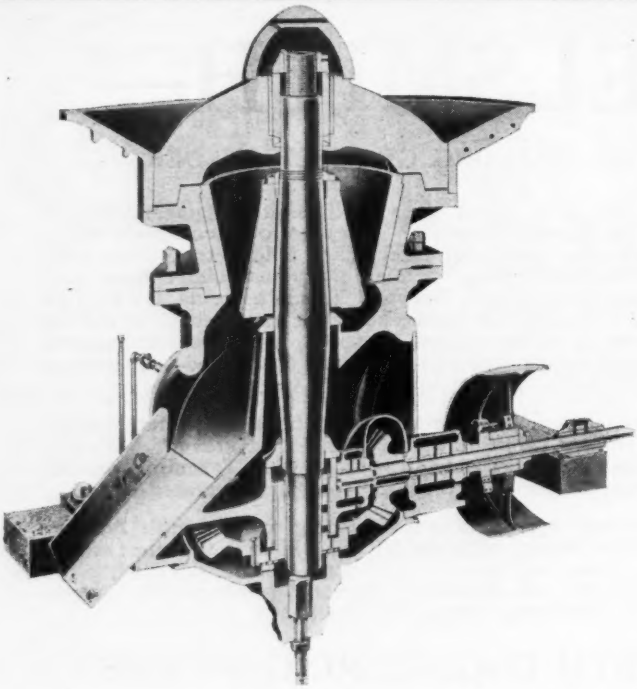
How would you like to stand close above any other breaker, jaw or gyratory, while it was crushing hard gravel? No reply is necessary; but figure out for yourself what Telsmith's parallel pinch means in terms of reduced labor and increased output.

Glad to mail you literature describing the Telsmith Primary Breaker—the crusher with the RIGID SHAFT, the short frame, low-arch crown, big eccentric and force-feed lubrication? Send for catalog No. 161 (Telsmith Primary Breaker) and bulletin No. 2-F-15 (Telsmith Reduction Crusher).

SMITH ENGINEERING WORKS

3183 Locust St., Wilwaukee, Wis.





Increasing Your Production

The requirements of road construction call for highly developed mechanical performance on the part of every machine on the job.

Austin Gyratory Crushers

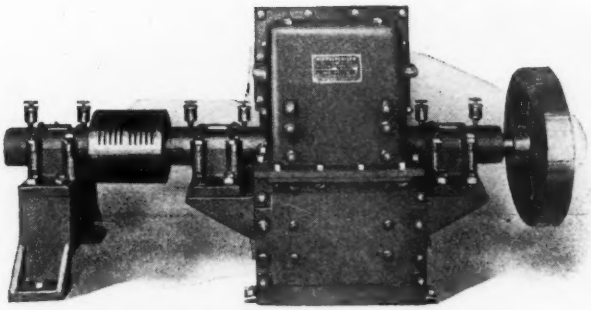
are designed and constructed to give maximum crushing service at minimum maintenance costs. Many exclusive features have been built into this machine, assuring a standard of efficiency found in no other crusher on the market today. Austin Gyratory Crushers come in eight sizes, 5 to 500 tons hourly capacity, and assure absolute reliability and continuous crusher production. Write today for catalog.

Austin Manufacturing Company

New York Chicago San Francisco

Canadian Agents: Mussens Limited, Montreal, Toronto, Winnipeg, Vancouver.

EXPORT DEPARTMENT
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA
51 Chambers St., New York, U.S.A. Cable Address: New York



By the very nature of of the Work

it is called upon to perform a pulverizer must be much stronger than the material it handles.

Only STEEL will stand the stress

"K-B"

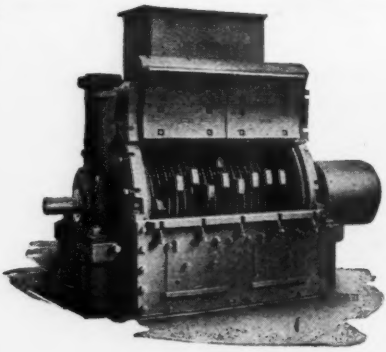
Is Built All-Steel

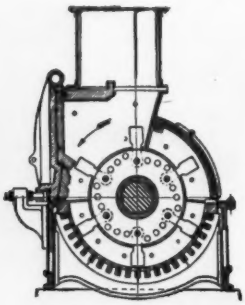
Catalog on request.

Trade K-B PULVERIZER Mark

K-B PULVERIZER COMPANY, Inc.

92 Lafayette Street, New York





Jeffrey TYPE "B" Ball Bearing Swing Hammer Pulverizer

for Breakdown of Large Pieces of Limestone, Gypsum, Shale, etc.

Leading Cement Mills, Lime Plants, Quarries, Gypsum Plants, etc., are being equipped with Jeffrey Swing Hammer Pulverizers to meet the constantly increasing demand.

Write for Pulverizer Catalog No. 147-K

The Jeffrey Mfg. Co. 990 North Fourth St. **Columbus, O.**

BRANCHES:
New York, Philadelphia, Pittsburgh, St. Louis, Dallas, Scranton, Montreal, Boston, Cleveland, Chicago, Birmingham, Milwaukee, Denver, Detroit, Buffalo, Los Angeles

Manufacturers of Pulverizing, Conveying and Elevating Machinery; Chains; Self-Propelling Loaders; Electric Trolley and Storage Battery Locomotives, etc.

Handle it Mechanically

DuPont—*First* in Development of Permissable Explosives

THE first Permissible Explosives, like most improved types of dynamites and powders, were introduced in this country by the Du Pont Company.

It is this sort of work that has given Du Pont Explosives their reputation for leadership and uniform value for over a century. Thousands of experiments are carried on every year in the Du Pont laboratories so that blasting may be done more efficiently, more cheaply and with less hazard.

Du Pont laboratories, Du Pont blasting experts, Du Pont mills and Du Pont transportation facilities contribute to make Du Pont Explosives Service one of the most valuable assets which the user of Explosives has at his command.

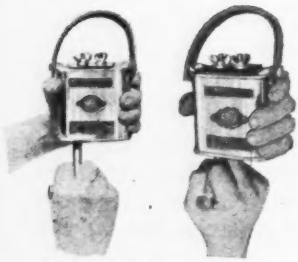
E. I. du Pont de Nemours & Company, Inc.

Sales Department: Explosives Division

Wilmington, Delaware

The DAVIS No. 1 Blaster

A lightweight machine for firing shots



Simple in Operation

Connect leading wires to binding posts. Hold the machine in the left hand (top of machine away from operator). Insert the key with right hand, in the slot at the bottom of the machine. Give the key a quick twist to the right as far as it will go. One turn is sufficient.

The many advantages of electrical firing, even in small shots, have created a need for a compact, lightweight blasting machine designed especially for firing a small series of shots. To fulfill this need the Davis No. 1 Blaster was developed.

This machine, which is small and convenient to handle, weighs only 3¼ pounds. It is very powerful for its size and develops ample current to fire 5 thirty-feet copper wire or 5 six feet iron wire Electric Blasting Caps, connected in a single series.

This type of blasting machine is particularly suited for coal mine blasting and for all other operations where not more than five shots are fired together.

The key by which the Davis No. 1 Blaster is operated is a separate part of the machine and may be kept in the possession of the shot-firer, preventing the operation of the machine by any other person. This is an important safety feature.

Deliveries can be made promptly from all distributing points. Requests for prices and more complete information will be given our most careful attention. Ask for Davis No. 1 Blaster circular.

ATLAS POWDER COMPANY

140 North Broad Street, Philadelphia

Branch Offices: Allentown, Pa.; Birmingham, Ala.; Boston; Chicago; Des Moines, Ia.; Houghton, Mich.; Joplin, Mo.; Kansas City: Knoxville; McAlester, Okla.; Memphis; Nashville; New Orleans; New York; Philadelphia; Pittsburg, Kans.; Pittsburgh, Pa.; Pottsville, Pa.; St. Louis, Wilkes-Barre.

Atlas Explosives

Hercules Dynamite In the Quarries

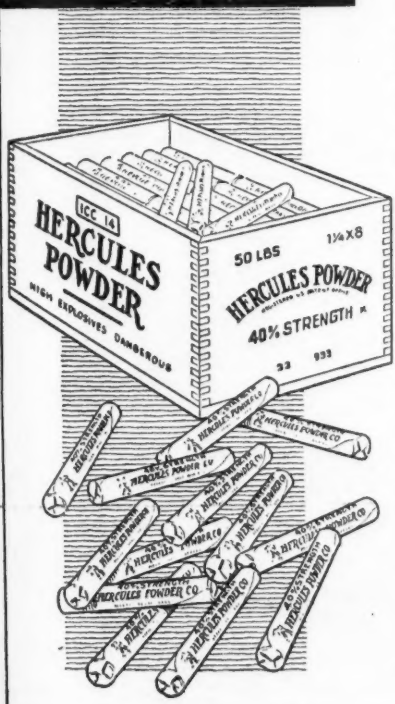
The wide use of Hercules Dynamite in quarries means that these explosives *make good*—that they can and *do* increase production and cut costs.

Dependable explosives—explosives which are known to be of high and uniform quality—are in constant demand in the quarries—and the name Hercules stands for all of this.

Hercules Explosives can help you in your work. Every blasting problem will be quickly and efficiently solved by one or another of the many formulas and strengths of Hercules Powders.

Your own knowledge of local conditions will probably enable you to choose the grade of explosives best suited to your needs, but we are always glad to advise on this when asked.

Our service staff will answer your questions promptly and fully.

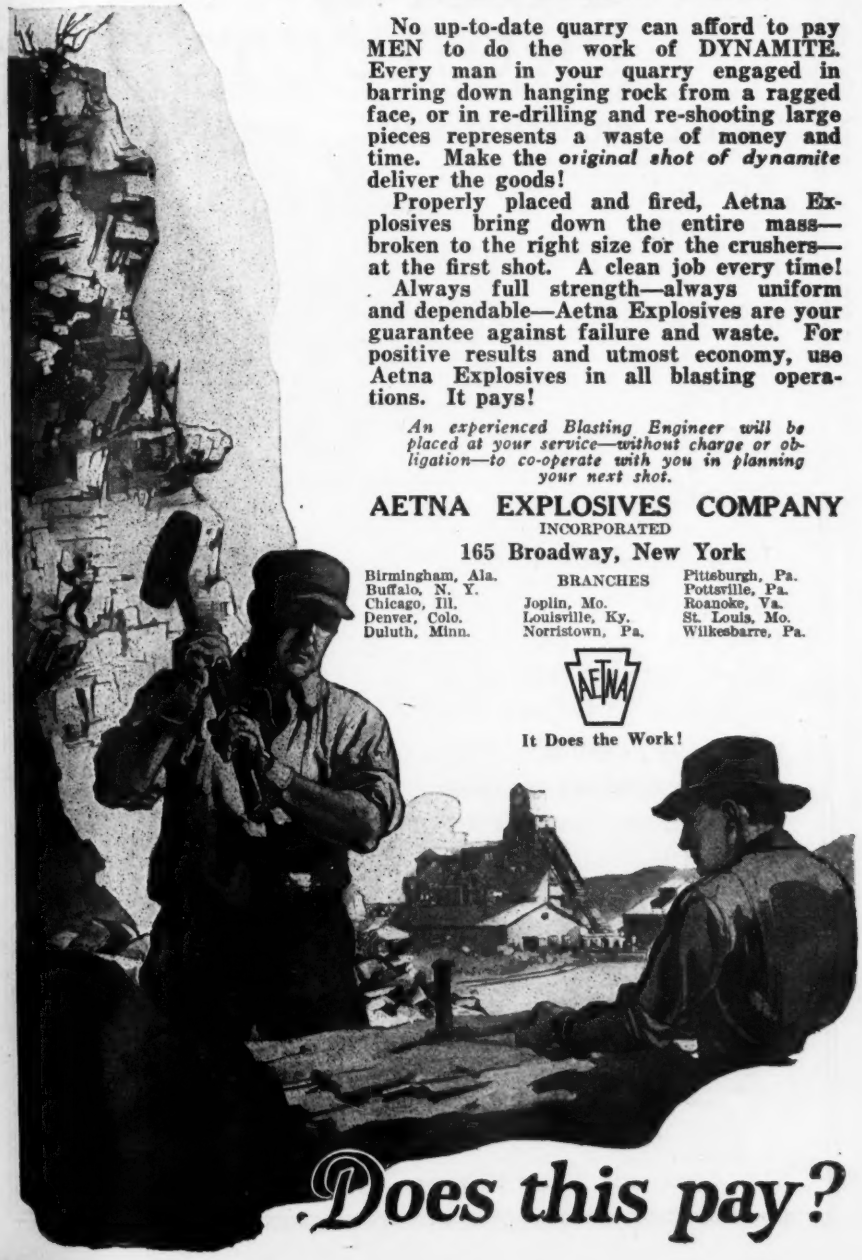


HERCULES POWDER CO.

Chicago, Pittsburg, Kan., San Francisco, Chattanooga, St. Louis, Denver, Salt Lake City, Pittsburgh, Pa., New York, Hazleton, Pa., Joplin, Wilmington, Del.

CHEMICALS
SPELTER
GRASSELLI
COLORS
EXPLOSIVES
Does Your Explosive Tear Up Your Tracks?
The selection of explosives plays a very important part in the operation of your quarry.
One explosive may bring down the rock in the size and shape you desire, but will scatter the rock over your quarry and play havoc with your equipment.
Another explosive may lay the rock where you desire, but in such sizes it must be re-blasted before it can be handled by your shovel or crusher.
But why not be sure before you load your holes?
There is a Grasselli Explosive particularly adapted to bring down your rock in the sizes you require and lay it where you want it. If you are east of the Mississippi, we shall be pleased to have one of our practical men go over your proposition with you.
The Grasselli Powder Company
Cleveland, Ohio
ESTABLISHED 1839
GRASSELLI
EXPLOSIVES

AETNA EXPLOSIVES



No up-to-date quarry can afford to pay MEN to do the work of DYNAMITE. Every man in your quarry engaged in barring down hanging rock from a ragged face, or in re-drilling and re-shooting large pieces represents a waste of money and time. Make the *original shot of dynamite* deliver the goods!

Properly placed and fired, Aetna Explosives bring down the entire mass—broken to the right size for the crushers—at the first shot. A clean job every time!

Always full strength—always uniform and dependable—Aetna Explosives are your guarantee against failure and waste. For positive results and utmost economy, use Aetna Explosives in all blasting operations. It pays!

An experienced Blasting Engineer will be placed at your service—without charge or obligation—to co-operate with you in planning your next shot.

AETNA EXPLOSIVES COMPANY
INCORPORATED
165 Broadway, New York

	BRANCHES	
Birmingham, Ala.		Pittsburgh, Pa.
Buffalo, N. Y.		Pottsville, Pa.
Chicago, Ill.	Joplin, Mo.	Roanoke, Va.
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Duluth, Minn.	Norristown, Pa.	Wilkesbarre, Pa.

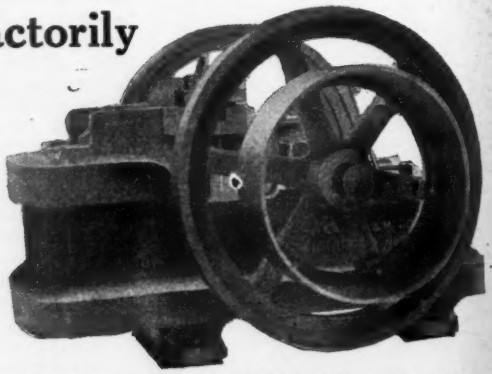
AETNA

It Does the Work!

Does this pay?

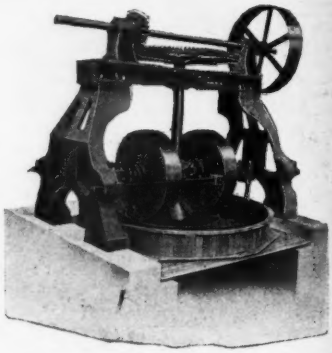
LEWISTOWN FOUNDRY PRODUCTS

Will satisfactorily meet your
CRUSHING
GRINDING
SCREENING
WASHING
DRYING
ELEVATING
needs

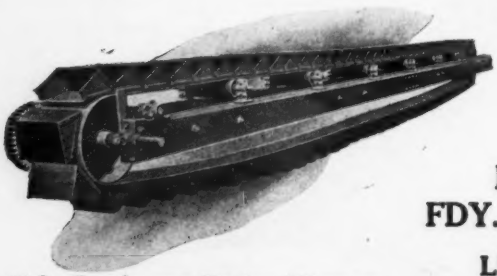


Lewistown Standard Blake Type Crusher

We manufacture a line of equipment for the above purposes in pit and quarry service and shall be pleased to furnish you with any desired information on whatever class of equipment you are interested in.



9-Foot Dry Pan



40-ft. Continuous Bucket Elevator

LEWISTOWN FDY. & MACHINE CO.
LEWISTOWN, PA.

The Great Triad

1. The Haiss "Path Digging" Wagon Loader.
2. The Gasoline Motor Truck.
3. The Mechanical Concrete Mixer.

To these three important equipment units every road engineer and building material dealer is indebted for the greater part of his profits and savings.

In New York—in Florida—even in far-off, torrid Hindustan,

Haiss Self-Feeding, Self-Propelling and Self-Crowding Loaders save the labor of man.

Digging swiftly, cheaply, gravel, stone or sand,

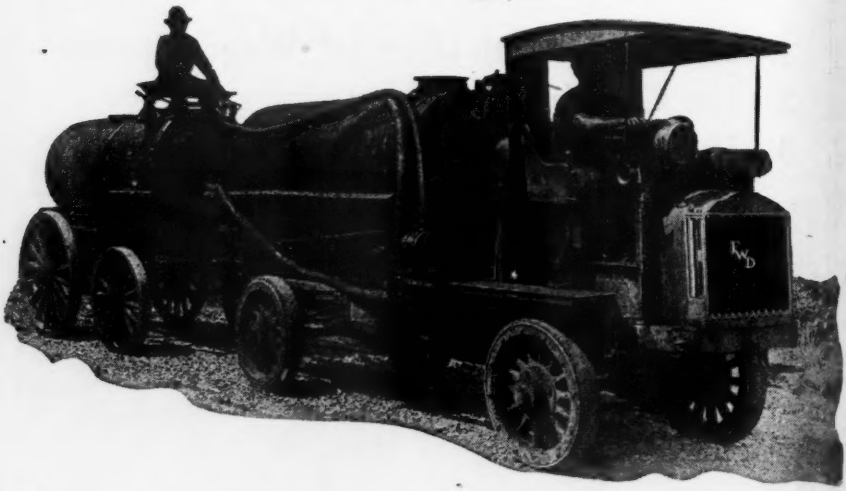
Or maybe reclaiming products on some storage land.

Write for Booklet No. 820

THE GEORGE HAISS MFG. CO.

142nd St. and Rider Ave. **New York City**

"Always gives just a little the best of the bargain"—



A statement from Wm. A. Marigold, Commissioner of Highways, Green Lake County, Wisconsin:

"The performance of the FWD under extreme service conditions is remarkable. It has done work six teams could not do. In four years our repair expense has been very small. The cost of gasoline, tires, oil and grease has been less than on our other trucks."

Concede the FWD its superiority in making light of hard work—still its dominant feature is economy.

FWD compactness, 56-inch tread, easy steering and small turning radius give it first call in tight quarters—sand pits, quarries, loading platforms, etc. It saves time on each trip—makes more trips—hauls more material in a day.

With over fifty forms of special equipment the FWD fits every need of the building and contracting business.

The Boys from the Front will tell you

FWD TRUCKS

Four Wheel Drive Auto Co.
Dept. 114 Clintonville, Wis.
Canadian Factory: Kitchener, Ont.

DUPLEX TRUCKS

BUILT FOR BUSINESS

AN actual photograph of a Duplex Limited being lifted clear of the ground by a cable around the wind-shield frame.

This wonderful strength in the cowl, while perhaps startling, is still only typical of the extra strong, rigid construction of the Duplex Limited in every detail and in every part.

It is this great Duplex strength and honesty of mechanical construction that makes the Duplex Limited a truck that a business man can buy and use on a practical business basis.

The Duplex *Limited*

Speed and Power to Spare—3000 to 5000 Pounds at 5 to 25 Miles an Hour on High and the Motor Turning Over Only 1300 R. P. M.

* * * * *

Free from Vibration—Scientifically Balanced—Electrically Equipped—Pneumatic Tired—Here is a Truck a Business Man Can Buy and Use on a Business Basis

SPEED and staying power are the big needs of the hour in trucks—and here is exactly the right truck for general business use because it is scientifically built for just exactly that kind of work.

Its balance is so perfect that one man can move it over the floor.

Its motor is so large and so powerful that *no special gear reductions were necessary*. The motor turns over only 1300 R. P. M. to develop rated speed with full load.

It hauls 3000 to 5000 pounds of any kind of freight.

It holds the road in a way you never dreamed possible in a truck. You can ride in it comfortably or drive it easily and without strain at full speed.

Its engine is properly and amply cooled—carries 2½ gallons of water and the water jackets are designed to properly cool valve seats where heat is greatest. Motor meter is seated in radiator shell and cannot be removed.

Complete electric equipment—that means starter too—so your driver won't mind shutting off the motor while truck is standing.

Easiest motor to take down you ever saw in a truck.

Large hand holes give easy access to valve chambers and man size bolts make handling easy.

Lubricating oil is strained twice in its circuit. Scientific hot spot breaks up wet drops into dry gas and makes even the present day gasoline develope full power.

Radiator mounted on patented spring suspension which prevents damage to core and eliminates the great source of leakage.

Standard tread—goes anywhere a passenger car can go and just as fast.

See it for yourself. It is a big, strong, rugged truck—will give you better service than you have ever known.

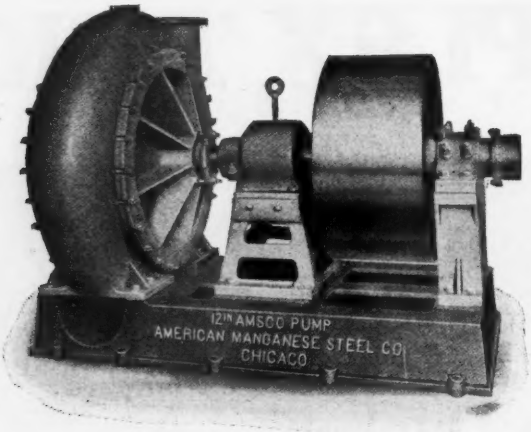
Any demonstration you want—it's a business truck and will do its work on a business basis. See your Duplex dealer—do it now—he will make the Limited prove itself to you as it is proving itself daily in the hands of users.

"Duplex Doings"—the Truck User's Magazine, sent *free* to any truck user. Tear off a corner of this page, sign your name and we will put you on the regular list.

Duplex Truck Company

Lansing · Michigan

One of the Oldest and Most Successful Truck Companies in America



AMSCO

Sand and Gravel Pumps Give Satisfaction

Of rugged construction, built for hard service. They stand up day in and day out, month after month. Their operating efficiency—percentage of days on active duty—is the reason they are bought in ever increasing numbers.

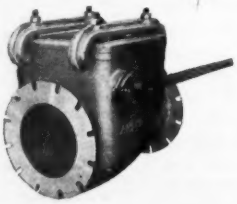
Manganese Steel for shells, runners, and side plates gives longest wear.

Slotted Flanges in side plates dispense with troublesome stud bolts. Solid ring gaskets are used.

Thrust Collar ball bearings reduce end thrust friction losses.

Balanced Runner and extra heavy shaft make the AMSCO Pump a smooth running machine.

AMSCO **Flap Valves**
Pipe
Elbows



Write for Pump Bulletin.

American Manganese Steel Co.

General Offices: 1875 McCormick Building, Chicago

Western Sales Office: Newhouse Bldg. Salt Lake City

Pacific Coast Office: Insurance Exchange Bldg. San Francisco, Calif.

Eastern Sales Office: Hudson Terminal Bldg. New York City

Foundries: Chicago Heights, Illinois—New Castle, Delaware—Oakland, California

"MARION" Steam Shovels have played a leading role in keeping sand and gravel production in step with the demands of engineering and industrial construction. Fleets of Revolving and standard Railroad types are today operating big pits that started years ago with one small "Marion."

Allegany Sand & Gravel Company
Olean, N. Y.

Our policy of limiting production to the standard models makes better deliveries possible. Tell us about your work. We'll be glad to furnish estimates and name delivery dates.

THE **Marion** STEAM SHOVEL CO.

Established 1884 Marion, Ohio

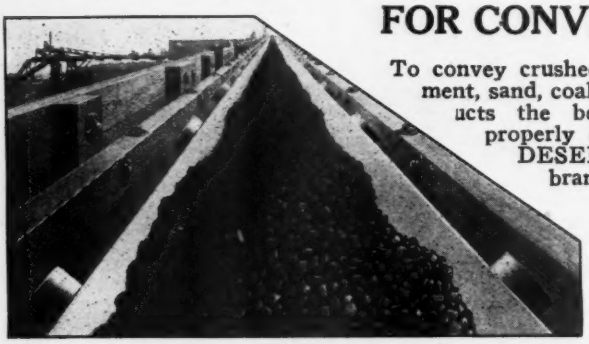
New York Chicago Atlanta San Francisco

Billings, Mont., F. B. Connelly Co.
Dallas, F. B. Wright, Bush Bldg.
Denver, H. W. Moore & Co.
Detroit, W. H. Anderson Tool & Sup. Co.
Philadelphia, H. L. Cox, 13th & Cherry Sts.
Pittsburgh, J. W. Patterson
Portland, Clyde Equipment Co.
Salt Lake City, H. W. Moore & Co.
Seattle, Clyde Equipment Co.
Montreal, Toronto, Vancouver, Vancouver Mach. Depot, Ltd. F. H. Hopkins & Co., Ltd.

EVERYWHERE—RELIABLE
The Marion Steam Shovel Co.
ESTABLISHED 1884

RUBBER BELTING

Without doubt belting is one of the most essential articles required for plant operation. Whether for conveyor or transmission duty our experience of over thirty years in the manufacture of rubber belting will enable us to furnish you with belting that will show you economy.

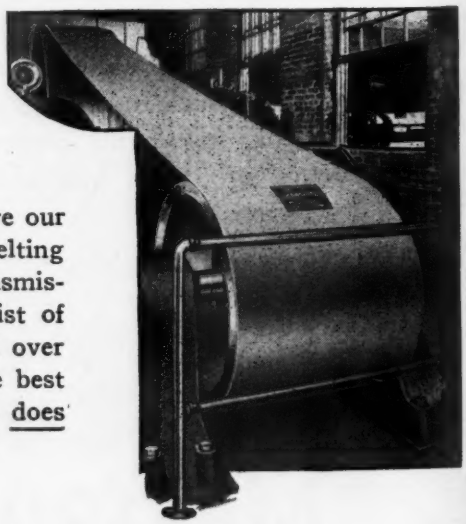


FOR CONVEYING

To convey crushed rock, stone, cement, sand, coal and similar products the belting MUST be properly constructed. Our DESERT and CROWN brands are made with the view of furnishing belts that will show the lowest cost per ton conveyed.

FOR TRANSMISSION

Belting for transmission purposes, especially on main drives, is so vital to plant operation that only a thoroughly reliable belt should be used. We manufacture our IRONSIDES rubber belting especially for hard transmission work. Our large list of satisfied users located all over the civilized world is the best proof that IRONSIDES does the work right.



QUAKER CITY RUBBER CO.

Manufacturers of Mechanical Rubber Goods

Philadelphia 629 Market St. | Chicago 182 W. Lake St. | Pittsburgh 211 Wood St.

New York, 53 Murray St.

Pit and Quarry

A Monthly Journal for Producers of Sand, Gravel, Stone, Cement, Gypsum and Lime
Member Audit Bureau of Circulations

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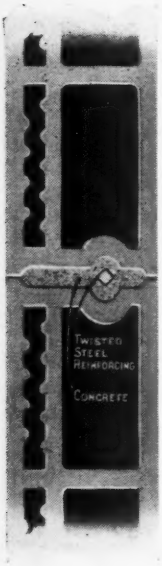

Vertical Cross Section of wall, showing the Preston-Lansing method of reinforcing.

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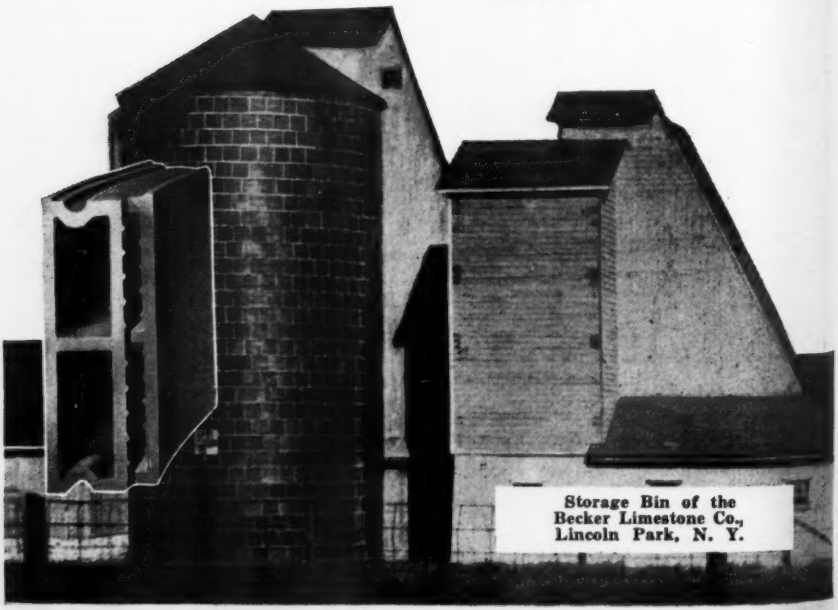

Storage Bin of the Becker Limestone Co., Lincoln Park, N. Y.

Pit and Quarry

A Monthly Journal for Producers of Sand, Gravel, Stone, Cement, Gypsum and Lime
Member Audit Bureau of Circulations

VOL. 4 CHICAGO, ILL., SEPTEMBER, 1920 NO. 12

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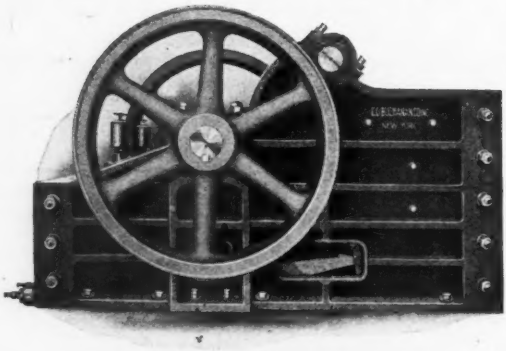
Crushers of Unusual Strength



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Pit and Quarry

Vol. 4 Chicago, Ill., September, 1920 No. 12

A New Operator Tells a Few Things He Has Learned

"Let me tell you something," said a man who had been engaged in the quarrying of crushed stone for about a year.

"I am a novice at the business, I realize that, but I have spent some months in starting my own quarry and getting it on a paying basis. At the same time I have devoted much time and study to what the other man is doing and has done. I have joined the associations, have talked with many operators, and have been fortunate in having some old experienced men to visit my plant and pass upon the way I am doing things, while I have also visited many quarries to see things for myself.

"In these trips I have been impressed by one thing that has been surprising to me, namely, that so many mistakes are made and not rectified and bad practices that are started are held to for months and years.

"It is interesting to tell some of these things, for inasmuch as they have been the means of my not making these some blunders myself, I think it well to pass them on to others so as to assist in this good work."

So here is the story as this operator told it.

IN one quarry two crushers were set up discharging into one pit to a large elevator. With a scalping screen and some belts and fly wheels revolving over the pit, a man sat on a ledge of rock with a shovel in his hand pushing the stone that lodged towards the elevator. There he sat with his head and arms within a few inches of rapidly revolving machinery, with a handkerchief tied over his mouth to keep out the stone dust. That he was not injured was more good luck than good management. I was told that this practice had been followed for nearly three years since the plant had been rebuilt. As an act of kindness I showed how the chute could be changed to make the stone roll by gravity to the elevator. The change was made at a cost of less than ten dollars, and the wages of a man saved. Hundreds of dollars had been wasted by this one thing.

Speaking of using gravity, it has been surprising to me to see how many quarrymen do not seem to know at what angle stone can be chuted by gravity.

Only yesterday I visited a quarry where the plant was being rebuilt. The same mistake had been made as

in the other quarry—the chutes from the two crushers to the pit at the bottom of the elevator were too flat. I had to show the owner that this was the case by sending stone through the chutes, and then show him how to remedy the trouble. Then I found that the bottom of his newly built stone bins was too flat. In this he had made the same mistake that I had, for after building my own bins I had to put a false bottom in them, so that the stone would run through the gates by gravity.

In one quarry trucks were loaded from gates in the side of the bins and these gates had been made so low that large trucks could barely get under them, so that to load the trucks more than half the load had to be pushed and shoveled over. To remedy this trouble it had been necessary to raise the bottom of the bin as well as the gates. Naturally the capacity of the bins was greatly reduced.

Gates should always be placed so that they will chute the material into the center of the vehicle, so that the material will pile up well and give the vehicle a good load without any rehandling. Thus, I have found it necessary to know the overall measurements of wagons and other vehicles. To make these mistakes and then rectify them means not only a loss of valuable time, but much money.

It is surprising in some large plants to see the errors that are made as to wasting space, both floor area and cubical space. Both may mean a loss of production and increased operating expenses. In one plant there were three belt conveyors from 15 to 20 feet long, due to the great space between the crushers. It would have been possible to have so set up the crushers as to have made these belt conveyors less than 10 feet in length, saving both in the original investment and in operating.

In another quarry some of the floors had a height of more than 12 feet, when from 7 to 9 feet would have been ample. Thus the elevator had to be much longer than necessary, handling the stone to a greater height than needed to chute it through the screens into the bins.

Yet in another plant of the same company the head room was so small that it was dangerous for a man to attempt to crawl around among the machinery, belts and pulleys. "Safety first" was not considered here, while to make repairs men had to work in such cramped positions that they were greatly handicapped at their work.

It is evident from this that crusher plants should be carefully designed and not "just built." Even after the designs are drawn some expert should be employed to go over and check up every detail, so that the original cost should be the minimum, and the operation the most economical possible.

Even expert advice must be followed with careful thinking upon the subject, and with judgment, as well as with the more intimate knowledge that an owner will have of his own project as against that of the expert, who may be called upon to make a rather hasty inspection.

On one proposition with which I am familiar, an expert stated that the spoil and stripping on the quarry was excessive and in addition there was no place on the property to dump this spoil. The owner had a survey made of the property, sunk test pits and made soundings, had the quantities of spoil calculated and found he had plenty of land to dump the spoil upon. It is intimate knowledge of a project. I find, that counts more than anything else.

I was interested in a recent article in PIT AND QUARRY, of how an office man made money out of the waste in a limestone quarry. This was expert advice within the organization, and yet it was also intimate knowledge of that

particular quarry as well as the subject of the use of limestone dust for agricultural purposes. Such a man is an asset to any business.

Recently I asked a quarryman, who has been engaged in the business for almost ten years, as to some of his costs, especially on a certain product, and he gave me some figures, but ended up by saying that these figures may be far from right for he could not tell what profit he had made, or even if he had made a profit, until the next year, when he would figure everything up. The man was sincere in this; but although I am young in the business, you can rest assured that I shall never wait a year to learn my costs and find out what my profits are to be.

I realize that it is difficult for a new man in any business to know exactly what his overhead charges will average, as compared to the man who has been operating a plant for years; nevertheless I will know something of such charges and I shall estimate them liberally and make them on each product high enough to cover unforseen difficulties, so that as I sell my product I will know whether I am making money, even if I cannot figure to the exact cent.

I carry life and accident insurance, fire insurance, public liability, employees compensation, even have my accounts insured, so as to cover all the possible chances of loss. This is good business, and I can see no reason why pit and quarry operators should not be good business men. If these things are done and other records are kept, certainly a man can have a fair idea of his overhead expenses.

Quarrying is a business that has many accidents in it, I find upon investigation, but there is no reason why a business man engaged in quarrying should not protect himself against the hazards of his business.

There are many other things I have learned, and I know there is much that is still new to me, but I feel that men should profit from the experience of others, so it is fortunate that such a paper as PIT AND QUARRY is being published, through which operators can learn from one another.

The J. K. Davison Sand Company, Pittsburgh, Pa., will soon place its new derrick boat and sand hoist in active operation; the vessel is one of the largest, if not the largest, wooden hull derrick boat on the local river. It has been building for some time past at Aspinwall. The sand digger, "Ed. Davison," has been stationed at Freeport, to furnish sand and gravel for a large industrial operation in this vicinity. The company's gasoline tow-boat, "Bronx," is also being used in connection with the project.

The Signal Mountain Portland Cement Company, Chattanooga, Tenn., recently organized with a capital of $6,000,000, has acquired property totaling about 500 acres at Signal Mountain, about five miles from the city, for the erection of a large cement plant. Plans for the initial units of the plant are now being prepared to have a daily capacity of about 3,000 barrels, and facilities for increasing this output to 5,000 barrels per day, as conditions require. The company will also operate extensive limestone properties in this district. George P. Dieckmann, manager of the Gulf States Portland Cement Company, Demopolis, Ala., will be in charge of the project. Others interested in the company are C. E. James, C. A. Lyerly and J. P. Hoskins, all of Chattanooga, and A. Y. Jameston, Mason City, Ia.

Lowell Sand & Gravel Company, Lowell, Mich., is a new enterprise which is headed by Fred A. Godfrey and John O'Harrow. This company has secured options on 331 acres of sand and gravel lands at Irving, Mich. Tests which have been conducted on 70 acres show an average of 40 feet of sand and gravel of first-class grade, giving a conservative estimate of 3,500,000 tons.

View of plant from across the quarry

Getting Out Sioux Falls Granite

BY THE EDITOR

With the Assistance of Oscar B.

ANY map of the country which aims to include all the important towns is sure to show Sioux Falls, S. D. In fact, it would be impossible to avoid it; for five railroads come together there, making a spot on the map which just has to be named whether one wants to or not.

This town has been noted for a number of things. In its earlier and less dignified days, so the older inhabitants will tell you, it gained country-wide fame for its divorce courts, and many are the socially prominent names which can be dug out of the archives at the Court House in Sioux Falls.

But the town outgrew this sort of thing, and no one was sorry when Reno came along and gobbled up the divorce mill business, except perhaps a few lawyers who were thus put to the expense of moving to Nevada. For the town had already felt the thrill of healthy, productive industry and had said down in its heart "This is the life." So in addition to being the clearing house for a large amount of South Dakota farm products, it has a considerable manufacturing business, meat packing, and various other lines.

Then there are the extensive deposits of the famous Sioux Falls granite. This is, of course, what we started to talk about all the time; but we just had to slip in these other things by way of introduction, because the town impressed us as a real town and worthy of more than passing mention, even in an article of this kind. For one thing, it gave us hospitable shelter and food in one of the finest hotels in a town of the size anywhere; and a good hotel which does not try to drive a traveler's firm into bankruptcy, is not to be considered lightly these days.

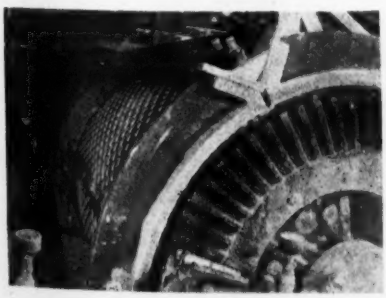
But in speaking of Sioux Falls granite we shall have to digress again. The first time the writer remembers of seeing this stone was at the time that Sioux City, Iowa, was getting such prominence as a builder of concrete pavements; and with all due respect to good engineering and competent construction, we thought at the time, and still believe, that one of the chief reasons for the success of these pavements was the quality of this granite, which formed the aggregate.

So it has been a pleasure to get up to Sioux Falls and see where this stone comes from. And now without further preliminary let us tell something about the new plant of the Wisconsin Granite Company, at Sioux Falls, which is the real purpose of this story.

This company owns extensive deposits of granite in this locality and has operated a plant at Sioux Falls for about twenty years, as well as other plants tapping the same geological formation. These plants were devoted originally in large part to the preparation of granite paving blocks; but with changes in paving practice and with the rapid development of a demand for good concrete aggregate for a variety of uses, the plants have gradually swung over to the exclusive production of crushed stone.

The Mitchell vibrating screen

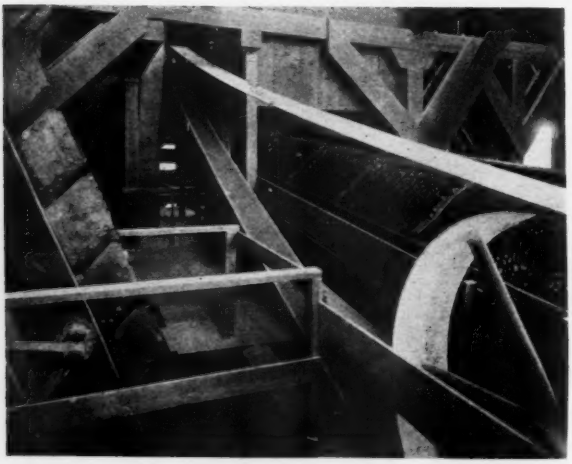
The new plant at Sioux Falls, now just being "tuned up" to put it in the best productive order, is built adjoining the old plant and takes its rock from the same quarry. In fact the two will be used to supplement each other, giving a flexibility which will allow the company to fit its production to the changes in demand. During the winter, for instance, the new plant can be completely closed down and any transient business can be taken care of by the old equipment. But during the busy season the new plant will be run up to full capacity and every advantage taken of its improved design and lower cost per unit of output; while any surplus production at the periods of greatest demand can be shifted to the old plant.



The sizing screen

The new plant when in full operation will produce about 500 tons per 10-hour day, with bins having a capacity for holding about two days' production.

The quarry has a face of about 50



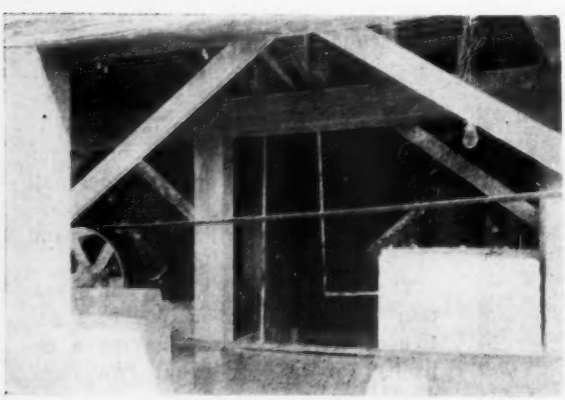
The scalping screen

feet, and heretofore has been operated by hand methods in two benches. The latter was thought to be necessary because of the extreme hardness of the material; but just recently a successful shot has been made for the entire depth of face, and this method will probably be continued in future, especially as a steam shovel has just been installed for handling the rock. This is a Bucyrus, Type 45C, with 1¾-yard dipper.

The surface of the rock is very uneven, producing many pockets of clay and loam, and for that reason it is planned to install a system of hydraulic sluicing, so that the rock may be thoroughly washed before drilling and blasting. The new plant is very compactly built, occupying a ground space of about 70x72 feet including the bins, and being just high enough to house the longest elevator, which is 79 feet center to center of pulleys.

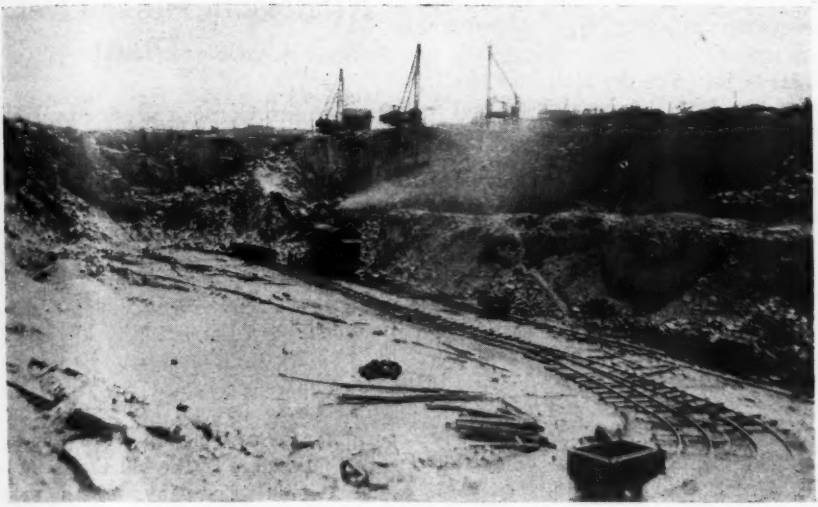
The steam shovel dumps into 2-yard cars which are drawn by horses to the foot of the incline leading to the crusher. Eventually, however, cars of larger size and more modern design will be installed and will be moved by means of a locomotive. At the top of the incline the cars dump into a 36x24 jaw crusher of the Blake type. From this crusher the material is taken by an elevator to the scalping screen about 50 feet above. This is a cylindrical screen 16 feet long and 48 inches in diameter, with 2½-inch openings.

The elevator which feeds this screen is a No. 8 B, 50 feet 6 inches center to center, carrying 89 buckets each 30x15x12 inches and requiring 114 feet of 32-inch 8-ply rubber belting.



The two crushers

The stone which passes through the scalping screen is carried immediately to the sizing screen above, while the oversize is discharged into a No. 6 K gyratory crusher for recrushing, delivering into the main elevator, which carries it up to



This shows the old quarry benches, and the recent shot where the whole face was torn down

the sizing screen. Any of this material which may be too large for market is discharged on a 20-inch 5-ply conveyor belt and returned to a No. 4 K crusher, from which when recrushed, it is delivered into the same main elevator and carried up to the top of the plant for sizing.

The main elevator is a No. 8 B—on 79 feet centers, with 135 sheet steel buckets, each 30x15x12 inches. It required 171 feet of 32-inch 10-ply rubber belting.

The cylindrical sizing screen is 24 feet long and 60 inches in diameter and separates the material into five sizes, ranging from dust to 2¼ inches. The first section at the head of the screen is 8 feet of $\frac{3}{16}$-inch perforations, with 7 feet of $\frac{5}{16}$-inch jacket; this is followed by 8 feet of 1⅛-inch perforations, and 8 feet of 2¼-inch perforations.

Where cars are loaded

The material passing through the $\frac{5}{16}$-inch jacket is carried down onto a Mitchell vibrating screen, Type 1, with 6x4 feet of screening surface, and with ⅛-inch openings. This screen is a radical departure from the ordinary crusher plant equipment, but is proving so successful that it is possible that other plants of the company will be similarly equipped.

The plant proper is operated entirely by electricity, and it is probable that the quarry will also be equipped for electric operation. The current is purchased from a public service company. Two different motive units are installed The jaw crusher, No. 6 crusher and No. 4 crusher, as well as the 50-foot elevator, the scalper screen and the hoist which takes the cars

from the quarry, are run by a 200-horsepower slip-ring type Allis-Chalmers motor.

This is belted to the main line shaft, which has a total length of 34 feet 6 inches. This shaft is in two diameters, made up of 22 feet of $4\frac{7}{16}$-inch shaft coupled to 12 feet 6 inches of $3\frac{7}{16}$-inch shaft.

The 79-foot elevator and the 60-inch screen are run with a 50-horsepower motor of the same type. The Mitchell screen is equipped with a Westinghouse motor of a very high speed, running 3,600 r. p. m.

The motors are equipped with automatic releases. The crushers all have overhead trolleys equipped with Yale & Towne chain hoists for convenience in renewals of parts, and general repairs.

On account of the hardness of this rock, it has been found necessary to equip the machinery with working parts of manganese steel whenever possible.

The larger part of the equipment was supplied by the Allis-Chalmers Company of Milwaukee.

This is one of a dozen plants owned by the Wisconsin Granite Company in various parts of the country. This company has its main office in Chicago, with Walter S. Primley as president and John J. Sloan as secretary and general manager. F. A. Brown is superintendent of the new plant.

The Superior Sand & Gravel Company, 925-931 Dime Bank Bldg., Detroit, Mich., announces the election of Mr. Frederick S. Beard as vice-president and general manager, succeeding Mr. Chas. H. Brodt, who is no longer connected with the company. This company is a large producer of builders' and pavers' supplies. Its president is Mr. Andrew H. Green, Jr., who bespeaks for Mr. Beard a continuance of the support and patronage of the trade, assuring them that Mr. Beard's best efforts will always be exerted to serve the trade in the very best manner.

Nicholson Takes Over Coosa Plant

Prominent Cement Operator Will Put Alabama Company on Its Feet

THE plant of the Coosa Cement Company, Incorporated, at Ragland, in Coosa County, near Birmingham, Ala., has been purchased by George E. Nicholson, of Kansas City, and associates.

The Coosa Cement Company, Incorporated, is the company organized by the bondholders in the old Coosa Portland Cement Company, which went into litigation in November, 1917, W. S. Lovell being named receiver and trustee and was operated up to December, 1918.

This property was taken over by George E. Nicholson, acting as trustee for other interests. A corporation will be organized shortly. Among those on the board of directors will be George E. Nicholson, W. S. McLucas, president Commerce Trust Company, Kansas City; W. T. Kemper, chairman of the board, National Bank of Commerce, Kansas City, and Senator Watt T. Brown, of Ragland, Ala. The active management will be in the hands of Mr. George E. Nicholson.

The plant has just started operations after a thirty day period spent in overhauling it after some years of idleness. Within another thirty days it should be running the full capacity.

The main office will be located at Birmingham and it is the present intention to market cement only.

The Christiana Clay Products Company, Wilmington, Del., has arranged for considerable expansion at its properties at Stanton, Del. In addition to brick manufacture, the company has developed a large sand and gravel deposit, and will install a modern washery at an early date.

Helping Labor Spend Its Money

By W. BARRETT HANKINS

HAVING lived with and been concerned with labor problems since early boyhood (my family being producers and employers) and in late years having seriously studied labor as one unit of purchasing power, in my work as merchandising counselor, I have reached the conclusion that contented labor is the result of the laborer's dollar well spent.

The laborer works to possess. His daily effort is for wages with which he may obtain that which he cannot create. I have clearly in mind diversified labor, from the American born (including the colored laborer) to the newly arrived immigrant. Each has his own method of living—But fundamentally the object of each man is to possess.

He first must have life's necessities —The bare things that hold body and soul together are the "first fruits" of his labor.

I contend that the producer or employer who watches over where (but not how) the laborer spends his pay check, is setting up quietly but surely a safeguard against discontent. From this point, is called into play, intelligent propaganda to inspire the laborer with the thought that his employer is a bulwark that stands between him and anything less than a dollar's worth for every one hundred cents he earns.

In much the same manner that the Associated Advertising Clubs of the world and Better Business Commissions of cities safeguard the public against false statements and products that lie, the employing producer must safeguard his men against the "Dollar Squeeze" and earnestly see to it that their dollars bring a full quota of value. The splendid results secured for the buying public by our civic and commercial organizations are just as easily obtained for the laboring man by the producer of earth and quarry products.

Too long we have allowed "Cheap John" store methods to prevail around a community of labor—Too long have we allowed the "Blood Sucker" merchants to thrive and wax fat upon the laborer's dollar. The result of such neglect on our part is evidenced today in Bolshevism, Radicalism and the general discontent that prevails world wide. Cheaply made gloves, poorly sewed shoes, clothing mostly cotton sold at wool prices, and innumerable other impositions are suffered by our laboring men who have not the spirit nor the education to stand up and talk for a better dollar's worth.

The result of such "usury" breaks down the contentment more quickly and surely than half of the problems of work alone. The inferior quality of articles makes necessary renewed purchases with the same unsatisfactory results. In time, the laboring man feels a keen resentment against even those who actually help him—He becomes imbued with thoughts that breed dislike for Capital. He blames those higher up because he must suffer such unkindness. The final result is in seeking another place to work, where the same condition exists. It only takes a few such moves to firmly sew the seed of discontent upon which so much of our present industrial disturbances is founded.

I am strongly convinced that the employer can do much toward helping labor reach a contented period. Not by a social uplift program and moral guidance from afar, but by actually helping in a tangible way.

The first important step is "Helping Labor Spend Its Money."

Keeping the wonderfully satisfactory results obtained in behalf of the public by the Better Business Commissions of cities, the same effort by the producers among the community stores where their men must spend their money, will bring about similar results.

Let every community storekeeper stand the inspection of a committee representing the producer, or employer. Give this committee the proper backing to enable it to have corrected all undesirable conditions—Let this committee probe into the selling methods. Let it search into the margin of profits—let it be able to say, these shoes, this clothing, etc., is not of the quality to warrant the price asked.

If every producer were to include such a service in his organization, in very short time the value of the laborer's dollar would be greatly enhanced. The material things so desired by labor would be more available plus that the articles purchased would give better service because of the better quality.

By making the dollar go farther, the laboring man feels and visions greater possibilities of possession with a day's pay. He begins to feel optimistic of his earnings. His work becomes more important to that end. Then follows an interest in his work which is the ultimate end of discontent. These things will follow as the night the day, if the interest of the producer is keen enough to start the plan of "Helping Labor Spend Its Money."

(Copyright 1920 by W. Barrett Hankins)

County Owned Thingamajigs

HERE is a striking and forceful editorial which can be given almost entirely in quotations from others.

A reader of PIT AND QUARRY sends us two clippings from a Wisconsin paper, with the following letter:

Am sending you herewith editorials from the Janesville Gazette of July 26 and 27.

As you possibly know, Rock County, with a $1,500,000 bond issue, is endeavoring to install its own sand and gravel pits, and, even further, to build its own roads.

It usually develops that wherever public officials endeavor to indulge in Soviet ideas by usurping legitimate business and entering fields beyond the point where they are supposed to function, the odor from the transaction becomes obnoxious to the public and press alike.

The first editorial, under date of July 26, says:

It is costing the people of Rock County some hundreds of dollars each day in loss of time and inconvenience by the present incompetent and ineffective method of doing highway work. This is particularly true of the Edgerton road which has now been closed for traffic since early in April because the highway commissioner wanted to do the work himself without a supply of adequate machinery, or prospect of material. We are calmly promised no relief from the condition and that the same thing will be repeated next year.

The road was sewed up tight for grading before there was either material or machinery in sight to complete it. It is probably too late to remedy the situation now. The time to have done it was before it happened. It was poor business poorly executed. In the meantime, with all the effort given to the Edgerton road, other roads are being neglected. The commissioner says they are good anyway. But roads require constant work to be maintained to the highest point of efficiency. Many of them are showing neglect.

The remedy seems to be in not making experiments that are costly to the public. The large fund for roads voted by the people may be a temptation to waste, but it is poor business. One of the results is seen in the Edgerton road. That should be a sufficient lesson to both the highway commissioner and the county board.

The following day the Janesville

editor warmed up to his subject and handed the highway commissioner about what was coming to him, under the heading, "Mr. Moore's Thingamajigs in Road Building." This is the way he did it:

Mr. Moore, the highway commissioner, is spending bunches of the money which the people voted for concrete roads, to build some sort of a thingamajig with which between now and the end of the century he expects to lay roads that will last to Judgment Day. In the meantime the public waits and it is costing thousands of dollars each week to keep the Edgerton road closed.

"I could lay all the hundred miles this year with my present apparatus, but I want to make substantial highways. For that reason I am inclined to let the people howl," says Mr. Moore. It may be they will; and it may be that Mr. Moore's challenge will be taken tamely and docilely. If Mr. Moore has apparatus that will lay one mile or a hundred and it is not capable of laying a "substantial road," he has no apparatus at all. Therefore out of Mr. Moore's mouth, all the apparatus owned by the county is condemned. We are rather skeptical about this. The summer is passing rapidly. The last three weeks have been ideal for laying pavement and building roads. The time of the county has been apparently frittered away in getting some kind of a machine that will build roads automatically.

Rock County wants its roads. It voted the necessary money for them. It authorized through its governing body the program of construction. The "people are howling" and apparently with very good reason. There was once a man who was purported to have said, "The public be damned." He did not get far with that. The roads of the county are being neglected. Roads deteriorate rapidly if not given the proper maintenance.

It may be a temptation to experiment with the people's money in road building. But it has proved unsuccessful in results here except in contracting promises to pay, untried machinery, closed roads, interference with traffic, hardship for the public, and nothing done. The county board might take the matter in hand unless Mr. Moore is the county board.

Purchasing Belts

BELTS used in crusher plants are subject to hard usage. Many of them are exposed to the weather while all are subjected to much dirt and dust, especially stone dust. For these reasons belts shouuld be selected with great care and discretion.

Besides the durability of the belt, two points stand out pre-eminently for consideration: these are the stretching and slipping of the belt.

There are many preparations used on belts to prevent them from slipping, and although many of these have merit and are a great help in operation yet a belt which gives the minimum of slipping under normal conditions is vastly superior to one that can only be prevented from slipping by applying some preparation to the surface.

Stretching, like slipping, means a waste of power and a decided loss in production. It also means time and labor spent to remedy the stretching; but until it is possible to remedy the trouble by taking up the stretch, the loss of power as well as production can readily amount to the cost of the belt in a few days.

It has always been one of the endeavors of manufacturers to make belts that do not stretch or slip. A belt to overcome these faults must be of the proper weight for the service it must render, and it must be exceedingly dense. One that is not dense will not stand changes in the weather from dry to wet and also in temperatures. Density likewise increases the resistance of a belt to wear. Besides being dense a belt must be pliable, must have great tensile strength and a huge co-efficient of friction. This last will prevent slipping.

In purchasing belts for power transmission, these are the factors to keep in mind. In other words, belts should be bought on specifications instead of buying them as one would nails.

Scaridy Jason

by Frank A. Halverson

FEAR'S a funny thing. It's sort o' mixed into the human family promiscuously. One can't always tell it, either, at the first glance. A big rip-snorter of a six-footer of a man may have it woven into his fabric plumb unknown to the outside world, but it's there, inside o' him, waiting for a chance to come out. Reckon all o' creation is on the same plan, but in various ways. The countryman is suspicious of the city, and a city dweller ain't at ease in a big woods on a dark night; a land-man can't get hilarious about the rough sea, and a sailor don't cotton to whizzing elevator shafts. Women don't like mice and other things, while kids whistle after dark if they've been playing too long and have been caught in the shadows of night. But when fear gits into a muscular giant like Jason Tubbs it's plumb funny. Yeah.

Jason wasn't scared at the common things. Oh, no! Talk to any of the miners in Torchlight and you'd hear how Jason, when just a boy, lifted a big hunk o' slate off his Daddy that had him pinned to the bottom and was squeezing him to death in the Sally Ann mine. Yeah! Hardened ol' miners had held back 'cause the roof was cracking, the timber breaking and the pillars groaning under the pressure of rock and dirt that had been undermined, and all of it was coming down on Jason's Dad when the boy sprang under the working mass and pulled his father to safety. Fear o' injury didn't bother Jason. It was another kind that put a tremble into his hulky body.

It was the fear o' women that had him. At that some men will agree that he was wise, but listen:

The first woman to put fear into him was his mother. Having spent his early years exclusively with her, Jason was pretty well saturated with her foggy ideas o' the haunted house wherein Miser McDougal had lived until he disappeared and where he was supposed to ramble on dark nights. This yarn had filled Jason with a fear beyond his control, and the second fear that he possessed was the worst o' all, namely, his love for Marie Campbell. Yeah! Not that she would instil fear in any man, 'cause Marie was a winsome, dainty, sort o' love me girl, with suitors a-plenty. However, most o' us eligible miners had been convinced that Marie was only interested in Jason Tubbs. Being men, we quit the race, excepting Alexander Fleming, the mine owner's son. He was a sort o' transplanted flower in our midst. His Daddy, being rich, had educated him in some city, and so he figured us, including Jason, as a bunch o' booby boys, uncouth and rough. But something didn't jibe in his mathematics, 'cause at the miner's picnic Mr. Alexander wedged his handsomely

tailored self in between Marie Campbell and Jason on the shaded bench when Jason was busy hiding his big feet and work-calloused hands; with the result that Jason's view of Marie was cut off by Mr. Alexander's broad back. Yeah!

Jason's fear, as usual, when with Marie, had him speechless and helpless. Scared o' that little mite o' womanhood who smiled at him most fetchingly, but 'twas true. Such was his state. However, in a minute Alexander found himself making an aerial ascent and a thumping descent onto the bench, so that his tightfitting coat split square in the center; and 'twas Jason's arms that was the motive power. Not once or twice did he bump him, but a dozen times, until Mr. Alexander's face was like a cooked beet and his clothes were plump disgraceful when Marie finally asked Jason to stop. She could have asked Jason to let up long before she did, but maybe she figured, like the rest o' us, that Mr. Alexander had it coming to him, and furthermore, I personally saw her turn away to laugh at Mr. Alexander's look o' blank astonishment when he landed the first time. At the second thump, he began to show some resistance, but what was the use? Jason was his master and he feared him.

Like a lot of men who are caught up in some questionable undertaking, Mr. Alexander whimpered that there'd come a time, but his fear of Jason was so evident that we all had to laugh at him even if he was the mine owner's son.

Alexander's fear was physical. He had it in one of the different ways. As Marie led Jason away from Alexander's sitting presence, she threw a quick glance over her shoulder and smiled at us, and by hunky! She was sure proud o' her big boy.

I was working with Jason in the Sally-Ann mine at that time, and like real buddies, we used to talk about a heap o' things when we were eating lunch at the turn-out, or resting a bit by the side track. Men'll git confidential, and as I was years older'n Jason and a lonely batch, too, at that, I asked him why he didn't start a wedding celebration with Marie and himself as the principal parties.

"I dasn't ask her," said Jason sadlike.

"Why, dog-gone your big hide, Jason, what's the matter?"

"I'm scared o' her," replied my buddy solemnly.

Scar'd! Gim-iny Christmas! Yeah! I bounded into him, using words only, raking him in all the human dimensions for a fliver of a hootchamacootch, and by and by, I saw a tingle of red color creeping up his neck and finally he said:

"Think I got a chance, Buddy?"

Imagine that from a big man. Anyhow, it made me desperate. I handed him his dinner pail and his coat. Stern measures were necessary in his case to get action and I made a resolve to give the love of god a boost. Yeah!

I made him promise that he would go home, wash up and dress up, call on Marie Campbell that night and tell her as a man should that he loved her and wanted her for a wife. He shivered and shook and pleaded that he would have to pass the haunted house on his way to Marie, who lived at Gilford, a mile away from Torchlight. It would be dark, too, and the fear that his mother had instilled in him was working. Yeah! Jason knew that if he passed the dismal house once he'd have to git by twice, because he couldn't stay at Marie's, and at eleven o'clock Father Campbell would come down the stairs to lock up for the night and bid him a sour good night. Anyhow, Jason left the mine after committing to memory the little love speech that I helped to compose. Imagine it, me, an old batch, who had never dared to propose, telling Jason how to do it. Fixing up how he should pop the question was easy, but in my heart I knew that he wouldn't do it. His fear would flutter the white flag o' surrender on him unless something happened. I proposed to have the unexpected take place with Jason that night, therefore, I followed him out on the next cage. I wanted to scare him plumb stiff, when he had passed the haunted house on his way to Marie's so that he wouldn't run home, but keep right on to his ultimate destination.

Meanwhile, Jason plodded homeward, sick at heart, disturbed mightily with love emotions, and when his mother saw him putting on his Sunday suit in the middle o' the week, she naturally inquired the cause o' her son's deliberate precision in dressing with such elaborate care.

"A little stroll," said Jason, coughing from his disturbed state o' emotion.

Mother shook her head and bid Jason expose his manly chest for a customary mustard plaster, her unfailing cure for a summer cold. Fortified with her concoction Jason opened the door to go when she called out her usual warning.

"Keep your eyes about you while passing McDougal's."

Jason started with a burst o' speed. He walked fast, faster and faster still, and as he neared McDougal's haunted house, he was running and making one step cover as much ground cover as much ground as two and at that he was not holding either of his feet back in his endeavor to reach Marie Campbell's while the love o' his heart was at a white flame. He passed the house. Then he stopped, throwing his arms upward. He heard the chain rattling over the old stones o' the front yard, and according to tradition that was how old McDougal was supposed to be doing his haunting—with a chain to capture the ones who had taken his money and his life. How that chain rattled! It bumped up and down, clang, clink, clank, like a gyrating snake o' silver in the starlight. It twisted, turned, leaped and jumped while Jason listened, and when my arm was getting tired from lifting the heavy links, Jason gave a hoarse scream and disappeared like an irresistible flash o' lightning toward the home o' his love. I had him going the right way even if it had been hard work for me to lie on my stomach and

rattle the chain from the shadows of the old porch of McDougal's haunted house.

In Jason's going he left part o' his clothes to dot the midnight scenery, and when he arrived at Marie's home, he hugged the gatepost instead o' her. She was sitting on the porch swing, luckily alone, 'cause Jason was a sight for only sympathizing eyes to see. Such a lover! But his fear o' nothing that could hurt him was pathetic, while in real danger he didn't give a whooping care for anything that made the average man turn pale in the face.

Panting by the gate, Jason hung to the post until Marie came to his assistance. And on the swing in the twilight, Jason began to recall what he had set out so boldly to do. His mind was a blank, so far as his love speech was concerned, 'cause in his race he had plumb forgotten it. Yeah! Something else was bothering him. A biting heat was consuming him and the night was cool at that. But Jason was burning up.

The heat seemed to be fiercest in the general locality of his breast, supposedly the seat of the tender passions. But it was more than love with which he was fired; his mother's mustard plaster was killing his summer cold with telling effect.

But of course Marie knew nothing of the mustard plaster; and as her admirer stood there, with one hand working convulsively over the spot where she thought his heart must be, and the other frantically tearing at his hair, she supposed that the critical moment had arrived, and drew still nearer to Jason.

"Aw-ooo!" moaned Jason, leaning forward so that his clothes might hang loose from the plaster, and allow a circulation of cooling air. In fact he leaned so far forward that he almost lost his balance and had to throw out an arm hastily to keep himself from falling—an arm which unexpectedly caught Marie in its clutching swing.

"I've, I've," spluttered Jason. He was going to confess that a mustard plaster was causing all the trouble when Marie interposed:

"I know, Jason, you've always been a scaridy, afraid to tell me of your love."

"Y-e-s," mumbled Jason, releasing the corner of the plaster which he had managed to tear loose through his clothing. For he had use for both of his hands right then.

At the Ohio Experiment Station and on many of the county experiment farms, the use of 100 pounds of acid phosphate to the acre has increased the wheat yield by 5 bushels per acre, while the residual effect of the fertilizer is also noted for several years, the increase in the hay crop following the wheat paying the entire cost of the fertilizer application in many experiments.

Natural Fertilizer Company, St. Augustine, Fla., has been organized with a capital of a half million dollars. This company plans the erection of a factory for the production of fertilizers. All the officers are Fernandina, Fla., men, as follows: I. B. Bussells, president; S. B. Teakle, vice-president; and D. N. Chadwick, Jr., secretary-treasurer.

Owing to the fact that some of the Central States are badly in need of phosphate, the middle-west smelters are showing a great deal of interest in the installation of plants for the manufacture of double super-phosphate. The gases are collected from the smelter and made into sulphuric acid, and the double super-phosphate is made with the phosphate rock and sulphuric acid. This gets rid of the fumes from the smelters and makes this by-product into fertilizers. Double super-phosphate can be handled cheaply on account of the high percentage of P_2O_5 contained in one ton of bulk material, this sometimes running as high as 48 per cent.

On Both Cheeks

The following is a part of a letter sent out to the members of the National Association of Sand and Gravel Producers, by V. O. Johnston, president, under date of Aug. 24.

AFTER receiving the decision of the Interstate Commerce Commission in the car-supply hearing, we dutifully turned our other cheek—and received on it the decision in the rate case. The clouds of adversity sure seemed to be drifting our way in great profusion and if they had any silver lining it was not visible from the stand-point of a sand and gravel operator.

We were not greatly surprised at the outcome of the rate case nor did we feel that our industry had been singled out for discrimination. All other shippers, some of whom were as much entitled to relief as we, were treated alike; and at the worst the decision meant only a continuance of existing, although unfair, rate conditions, with the door left open and an invitation extended to enter at a later date and bring our rate troubles with us.

The decision with reference to car supply, however, was quite different. Our claim there, as we believe, and as do many able attorneys and even some railroad officials, was founded on justice and the fundamental law of the land. The denial of it, under the circumstances, and the continuance of priority orders in favor of coal, are actually creating, as we predicted they would, an "emergency" in the business of the country of far wider scope and more disasterous consequences than the so-called shortage of coal in the northwest and the northeast could have been. If transportation is an industrial activity of such general and vital importance to the welfare of all the people of the country as to warrant governmental control, then it follows that it must be one in which all should have equal rights—and in times of shortage all should bear an equal burden. Otherwise, our government, in the exercise of its regulatory powers, is not securing to all its citizens, in equal measure, their constitutional rights and privileges, which in peace times at least may not lawfully be denied.

With this view of the situation firmly in mind, there is but one course of action open to us, and that is a persistent, consistent and forceful campaign to secure our rights. We must remember that industrial conditions are far from normal, that transportation for some years to come cannot meet all the demands placed upon it, and that some interests must suffer. It took a long time to place us as a nation on an efficient war basis and the readjustments to peace activities will be equally long and arduous. We are face to face with new methods of doing business, without much in the way of precedents to guide us. To some extent, therefore, we must feel our way, must refuse to be discouraged by temporary set-backs in our program and must cling to principles rather than former practices.

Despite the continued car shortage and the adverse rulings of the Commission, there is, in my opinion, much of encouragement for our industry in recent developments. We have gone a long way in securing the recognition of

our products as basic and establishing their importance, as well as that of the many dependent upon them, in the minds of governmental agencies and railroad officials. We have secured a large amount of publicity and thereby drawn to our efforts the cooperation of several powerful interests. Our progress seems slow and altogether too unproductive of immediate results; but it must be remembered that the means at our disposal are limited, and, as compared with those of the interests arrayed against us, insignificant; that as an Association we have the financial support of but a fraction of the producers of the country and that many of these, for unexplained reasons, have allowed a comparatively few to carry the unusual burdens of the past six months. This condition cannot continue if we are to attain any great measure of success. We *must* have the hearty cooperation of a large majority of the producers of the country. We, as an industry, must unite and so stand, or being divided, fall. We must learn from the success of other industries the lessons of close contact and unified action for our common good.

We had planned early in the year an aggressive campaign for membership, but the unusual and unexpected demands on the time of Mr. Sutton and the officials of our Association made it impossible of accomplishment. We are now, however, planning to hold a series of meetings in different sections of the country, the objects of which will be to secure additional members, to acquire first hand information from producers as to their needs and suggestions as to our usefulness in matters of cars and rates, and to acquaint them with the work of our Association and its proposed program. I plan to attend several of these meetings and hope they will be of real value to our members, as I am sure they will be to our Association work.

I spent last week in company with Mr. Sutton arranging for a legal program which will bring to a test the question of our rights to a fair share of available equipment. I have every reason to believe that Attorney Francis B. James of Washington will handle our case as successfully as he has several others of a similar although not so comprehensive a nature and that ultimately it will mean an end of the discrimination from which we are now suffering. Whether he succeeds or fails, however, I am convinced that our fight will not be really finished until the next Congress is convinced of the justice of our proposition and the importance of the free movement of our products and those dependent on them in this reconstruction period.

I also attended several sessions in New York of Senator Calder's Committee on Reconstruction and believe that the inquiry it is making in the matter of denial of transportation to construction work at a time when the country needs it most, will be of real benefit to our cause when presented to Congress. The summoning of Daniel Willard, representing the railroads, Commissioner Aitchison of the Interstate Commerce Commission and Col. Wenz, President of the National Coal Association, to appear before the Committee to explain their participation in bringing about the present crisis, will serve to emphasize the fact that the country will hold to a strict responsibility all those who assumed to tamper with the economic law of supply and demand and thereby create grave injustice and immeasurable industrial loss.

Transportation Permits

Sutton Tells How to Get Them and Gives Form for Application

FROM the office of the National Association of Sand and Gravel Producers, Business Manager E. Guy Sutton has recently sent out a letter to the membership, outlining the procedure to be followed in getting cars, in consideration of the most recent action of the Interstate Commerce Commission. Mr. Sutton says:

By action of the Interstate Commerce Commission on August 11, Service Orders Nos. 7 and 9 were extended for another period of 30 days. Mr. Daniel Willard in testifying before the Senate Committee on Reconstruction and Production stated that, in his opinion, these orders should not be cancelled until after November first. It, therefore, appears that there will be no appreciable change in the open top car situation before the close of the present season.

In view of the prospect for a continuation of the restriction placed upon car supply for the movement of sand and gravel, arrangements have been made for applications for transportation permits to be submitted to the Commission on Car Service in cases where the furnishing of cars would otherwise be in violation of the existing Service Orders.

If the circumstances and conditions justify a special treatment, the Commission on Car Service will in turn ask the Interstate Commerce Commission to give authority for the railroads in question to furnish cars for the project covered by the application.

Enclosed herewith is a blank form for use in making request for a transportation permit for either (1) highway construction and maintenance; (2) private construction.

The application when involving highway work must be signed by the state, county, township or municipal authority having charge of the work.

The form of application referred to was worked up in conjunction with Mr. Thomas H. MacDonald, director of the Bureau or Public Roads, who is forwarding it also to all State Highway Departments. It is recommended that if you are interested in having these permits issued that you take the matter up with the proper highway authority and give assistance in supplying the required data.

It must be recognized that the necessity and importance of the highway work for which special attention is requested will determine whether permits covering car supply will be granted.

The Commission on Car Service will also give consideration to requests for permits for the movement of material intended for important building work, such as houses, grain elevators, water works, buildings for conserving food and manufacturing agricultural products and all projects involving the welfare of the general public.

In the event permits are requested for private work the applications must be signed by the owner or authorized officer of the firm making the application.

In this connection we wish to emphasize the fact that it will do no good to make promiscuous requests for transportation permits and that all information submitted should be of the most reliable character and based absolutely on actual requirements. We strongly recommend that no undue advantage be taken of the assistance that is offered by the Commission on Car Service or otherwise the privilege may be withdrawn.

If you wish to transmit the application through the National Association we will see that the matter is expedited and will also advise you as soon as action is taken by the Commission.

The application blank worked out for this purpose, and accompanying Mr. Sutton's letter, is as follows:

APPLICATION FOR TRANSPORTATION PERMIT.

Dated at.....
(City) (State)
.....1920.

Commission on Car Service,
American Railroad Association,
718 Eighteenth St., N. W.,
Washington, D. C.

Gentlemen:

Application is hereby made for permit to use open top cars for purposes and subject to the conditions herein specified for shipment of (commodity) .....

1. Name shipper.....
2. Office address.....

3. Railroad on which plant is located .....
4. Name of billing station.....
*5. Rated daily capacity of plant.....
.....
6. Shipments required:
(a) Consignee .....
(b) Destination .....
*(c) Number open top cars required daily .....
*(d) Total number of cars required to complete project.....
(e) Route .....
7. What reason do local railroad officials give for not furnishing cars..
.....
8. Description and importance of the work for which material is needed. (Describe class of work and give supporting details and specific information in supplementary letter. If Federal Aid project, give number.)
.....
.....

The undersigned official certifies to the correctness of the above data and requests that car supply be accorded.

(Signed) .....
(Official Title).....

*On basis 50 tons cars.

Agitation has been started in many sections of Indiana, because of the large number of spring drownings, to secure some protection against the menace of the abandoned gravel pit that fills up with water and makes such an ideal place for swimming purposes. In one or two sections the residents of the neighborhood are attempting to crystallize some sentiment in favor of making it mandatory that the owners of abandoned gravel pits safeguard the pits in such a manner as to reduce drownings to a minimum.

Pulverized fuel equipment has been accorded a place of absolute reliability and its adoption by many prominent industrial concerns in both metallurgical and boiler furnaces have placed pulverized coal as standard equipment for such service and because of its efficiency and reliability it has *been* and is steadily growing in favor throughout the industrial world.

The Cedar Park Stone Company, Leander, Tex., recently organized, has acquired property totaling about 100 acres, and plans for the establishment of a stone crushing plant with initial daily capacity of about 100 tons. T. L. Allen is president and manager.

Indiana Shippers Heard

Protest Threatened 40 Per Cent Increase in Freight Rates

By Our Indianapolis Correspondent

THE sand and gravel industry had its inning before the Indiana public service commission Tuesday, August 24, at Indianapolis, at which time evidence was given the commission to show why the sand and gravel industry should not be subject to a 40 per cent freight rate increase by the railroads.

No decision was given at the time of the hearing, the commission preferring to wait until all the objectors, which include brick men, slag, rock, coal and other industries, had stated their cases. The sand and gravel men, however, are looking for a prompt decision after the hearing has been concluded.

During all the hearing the railroads' representatives urged that they be given the 40 per cent increase for the time being and promising that they would see that no hardship was done to any particular industry. They said they wished the increase right away in order to go ahead with the contemplated improvements to the systems.

O. P. Gothlin, attorney for the sand and gravel interests; George G. Nattkemper, of Terre Haute, and H. C. Huffstetter, president of the National Association of Sand and Gravel Producers, testified. Mr. Gothlin asserted that it would be unjust for the commission to grant the requested freight rate increase in Indiana before the railroads have brought about an adjustment of discriminations which he said exists against the shippers of such commodities as sand and gravel.

Mr. Nattkemper told of a contract held by his company for the construc-

tion of a concrete road comprising about 7½ miles of the National road near Brazil. The company has been delayed in the completing of the improvement because it has been unable to obtain materials, as the result of the shortage of cars, he said. The company would have to stand an additional cost of $11,760 on sand and gravel for the work if the 40 per cent freight increase becomes effective on these commodities he said, and an increased cost of about $4,000 for cement would have to be met. These added costs would cause the company to lose heavily on the contract, he said. Other contracting companies would be placed in similar predicaments, he declared.

Mr. Huffstetter said the costs of operation of sand and gravel companies have advanced greatly, and he said, the companies have already been confronted with freight rate increases amounting to 51 per cent. An added increase would work a decided hardship on the companies, he said.

Luther R. Marin, traffic manager of the Indiana Northern Railway Company of South Bend, made a brief statement to the commission, asking that the increased freight rate proposed for the state apply to the switching operations of his company. He said his company has been operating at a loss for the last three years.

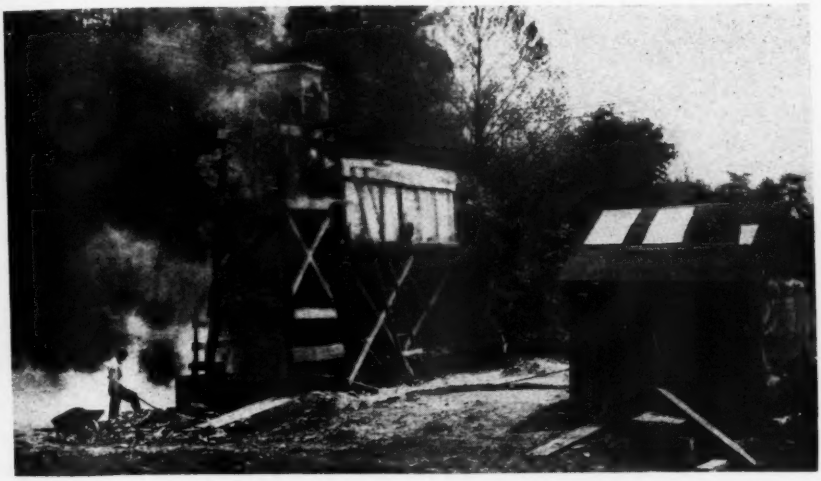
H. R. Kurrie, president of the Monon Railroad Company, testified that the railroads of Indiana are entitled to a "square deal," and declared that the intrastate rates in Indiana must be increased if the roads are to operate with any degree of success.

The sand and gravel interests were fortunate in securing the aid of various civic bodies in the state, chief of which was the Indiana State Chamber of Commerce. Officials of various civic organizations testified before the commission and complained of discrimination between the industries of Illinois and Indiana in regard to freight rates. They declared these alleged discriminations, favoring the commercial interests of Illinois, should be eliminated before any increase in intrastate shipping rates is granted in Indiana. Among those who made statements were R. B. Coapstick, of Indianapolis; H. E. Fairweather, of Ft. Wayne, representing the Ft. Wayne Chamber of Commerce; J. J. Netterville, of Anderson, representing the Anderson Chamber of Commerce. All alleged discrimination between states and their testimony was borne out in the statements of sand and gravel men, crushed stone interests, and others.

O. P. Gothlin, of Dayton, testified in the interests of the sand and gravel, crushed stone and log shipping interests of Indiana. He said he was not opposing the granting of increased shipping rates to railroads, but his interests demanded that inequalities between the rates of the two states be ironed out before the commission enters a final order granting intrastate increases. It was pointed out that the shipping rates in Illinois have been lower than those in Indiana, but the Illinois shipper, under the proposed increases as authorized by the public service commission in that state, will meet an increase averaging only 33⅓ per cent, while the Indiana shipper, if the rates asked in the petition are granted, will receive 40 per cent increase.

Touring Europe

Mr. J. K. McIver, Jr., manager of the fertilizer department of the Agros Corporation, 27 William street, New York City, sailed on July 31, on a European business tour for his company. He sailed on the steamer Stockholm, and will go direct to Gothenburg, Sweden. After a short stay in Sweden he will go to England, and thereafter will also visit the countries of Continental Europe. He is accompanied on this trip by Mrs. McIver.



Small limestone plant at Vanport, Pa.

Small Limestone Plant

New One in Pennsylvania Has Just Begun Successful Operation

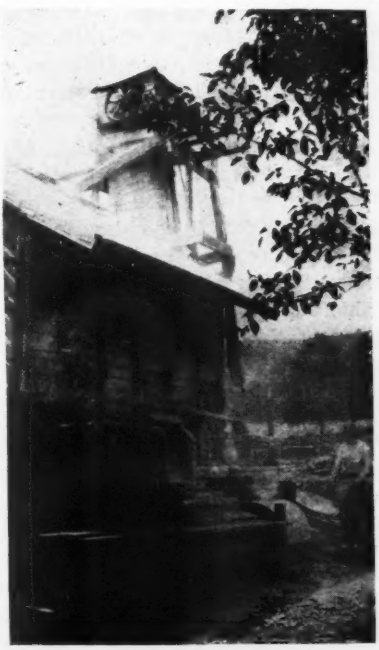
A NEW plant for the production of agricultural limestone has just been put into operation at Vanport, Pa. The owner is Richard Wilson, of Beaver, Pa., who writes as follows regarding the plant:

"At present we are only making pulverized limestone for local farmers. We have a No. 3 Jeffrey lime pulver connected to a 25 horsepower Westinghouse motor. Our storage bin will hold 45 tons and is so built that we can load the wagons and trucks through a spout by gravity.

"The pulver is set level with the bottom of the vein and the finished product is elevated 27 feet to the top of the bin. The motor is set about 10 feet above the pulver and 20 feet away cut of the dust.

"The plant is located at Vanport, Pa., on the Ohio river and within a stone's throw of the Cleveland and Pittsburgh Railroad. We have a 12-foot vein of limestone with from 1 to 30 feet of dirt on top, which we strip by tractor.

"W. F. Wigley is the superintendent and designed the plant. We employ three men to keep the plant up to a 30 ton a day output."



When the plant started the steam shovel emptied directly onto the grizzly.

A Plant of Extreme Flexibility

AS between gravel and crushed stone, J. L. Shiely, of St. Paul, insists on maintaining an absolutely neutral position. You can't get into an argument with Joe, for he just will not argue.

His neutrality is probably what got him the presidency of the Minnesota Mineral Aggregate Association, which is made up of producers of both materials. And very likely it was this, too, which led him to insist on such a flexibility of design in his new plant at St. Paul, so that it will produce both materials, and will combine them in any desired proportions if you just say the word.

This new plant, which is located on the Great Northern Railroad at Snelling Avenue, was designed and equipped by the Link-Belt Company, of Chicago; and the engineer who is responsible for it says that Shiely kept his brain in a whirl for a long time, putting in all the possible combinations which the owner wanted.

But the result is that all you have to do is to name your material, and by the proper combination of elevators, gates, chutes and by-passes—you have it.

The plant is located right in the heart of the deposit, with practically no working space, and has set about eating its way out into the open. One of the illustrations shows the steam shovel placing its load directly on the grizzly over the belt conveyor to the crusher house. At the present time, however, the excavation has progressed far enough to permit of the installation of a small system of trackage, with horse-drawn cars; and the next step, as the bank recedes, will be the laying of a circular track around the pit, up over the hopper, and trains of cars, drawn by a locomotive or two, to keep up a continuous supply of material.

The plant has a capacity of 3,000 tons daily, including three grades of gravel, two grades of sand, and two grades of washed crushed stone. It ships by rail to four states, in addition to operating a fleet of seventeen 5-ton Mack trucks for near-by deliveries. To insure the operation of these trucks in and out of the plant in all kinds of

weather, the company has built a concrete driveway up the hill out of the plant onto Snelling Avenue.

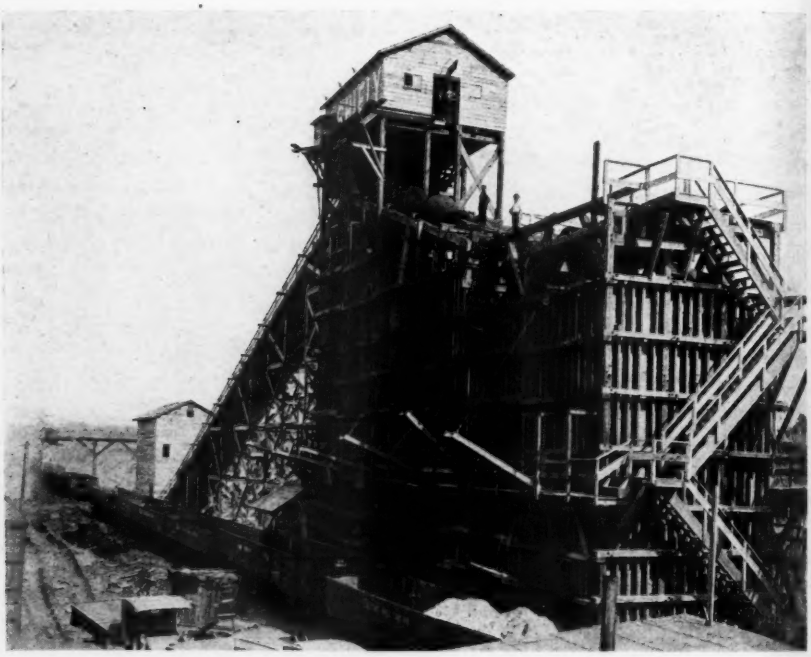
The plant is operated throughout by electricity. It has its own water supply, drawn from a 12-inch well 500 feet deep.

In the operation of the plant, the material is carried by a 30-inch belt from the stationary field hopper to the crusher house. Here it is ordinarily passed through a 48-inch by 12-foot screen with perforations representing the largest size of gravel produced. That which passes through this screen drops onto one of the two main belt conveyors—the one leading to the washing and sizing screens for gravel. The oversize from the first screen goes to a Telsmith crusher, from which it is taken up by a bucket elevator to a point where it cna discharge in two directions; either back into the screen from which it was thrown, or into another screen with smaller perforations. That which passes this screen can go either onto the gravel belt and be mixed with the gravel, or onto the second or stone belt and become crushed stone. The oversize goes to a second crusher, whose product can also go onto either belt.

J. L. Shiely

Note at the left the concrete driveway for motor trucks

It should have been stated, too, that changes in demand can also be met by switching the material as it comes from the pit directly into the second screen instead of the first. This will have the effect of producing a



The question is: Where did Shiely get all these cars?

larger percentage of stone under normal conditions, and will also serve to shorten the operation at times when the product of the pit is running very light in large gravel and boulders.

The main belts, which are of 24-inch width, have head pulleys on a common countershaft, driven by the same motor, but with individual clutches so that they can be run independently.

The crushed stone conveyor discharges into a conical jacketed washing screen, while the gravel conveyor empties into a single set of inclined conical screens and preliminary scrubber, followed by two conical sand separators for the two sizes of sand.

The bins are the ordinary type of timber construction on 6-foot concrete foundations, and with chutes for loading cars on one side and trucks on the other.

Then there is introduced on the truck side an unusual feature in the way of an additional chute from each bin, at a higher level, and discharging onto a 16-inch belt conveyor. The purpose of this is to run material from any bin to a stock pile as desired. This part of the equipment is not completed as yet; but when in full operation, the primary belt, extending some distance beyond the bins, will empty onto a movable belt section equipped with a tripper, so that a stock pile can be built up at any point.

The steam shovel will be taken out of the pit and used to load from stock pile during the closed season.

The New Brookland Sand Concrete Company, Brookland, S. C., recently incorporated with a capital of $50,000, is arranging for the development of sand and gravel properties in this section. The company will specialize in the production of a high grade sand, suitable for concrete construction, as well as broken stone and affiliated specialties. D. E. George is president, and J. S. Bundrick, secretary and treasurer.

A Visit to the Potash Mines of Alsace

Extracts from a recent Bulletin of the U. S. Geological Survey

By HOYT S. GALE

IN the descent into one of the Alsatian potash mines nothing can be seen of the deposits passed in the shaft, because they are covered by the concrete lining of the shaft, or, near the top, by a metal collar. The first sight of any of the underground deposits is obtained as one steps from the mine cage into the mine workings. Here broad entries, well lighted by electricity, have been excavated in the thicker of the two potash beds. The galleries branch in various directions and are closed here and there by doors (brattices), which are needed to direct the circulation of the air that is forced through the mine for ventilation.

The sight of the potash salts in place is striking. High walls of sparkling crystalline salts are banded in approximately horizontal stripes of red and white, more or less wavy, giving the impression of a portion of an immense flag. On clean mine faces the colors are beautifully clear. Some of the bands are a deep, rusty red or brick red. Other portions are delicately pink, and there is much white and gray granular crystalline material. The belief that the red and some of the pink salts are directly associated with the richer potash portions of the bed is so generally expressed throughout the field that it must have some foundation in fact, although perfectly white or transparent crystals of almost pure potassium chloride have been found. Examination in detail shows that the coarse crystals, both red and white, are much intermixed, and it is not usually possible to trace a distinct boundary between them, but in general aspect the banding is very distinct.

The top and bottom of the potash beds, where the salts rest against adjacent clay or shale seams, are, however, very clearly delimited. The shale leaves a very smooth clean surface in the roof of the mine, marked by some irregular pits or patches, but usually breaking clean from the salts. This is also true of the clearly defined shale seams that occur within the potash bed.

The two beds preserve their individual characteristics, including general thickness and relation to each other, as well as details of the shale partings and chemical character of the constituent members, with remarkable constancy throughout the field. The upper bed, containing about 3 to 5 feet of potassium chloride of richer grade than the lower bed, is the thinner. It is separated from the lower bed by about 60 feet of saline shale which, where exposed in the mine workings, is almost slate-like in appearance. When this shale is exposed to air or moisture it swells so much that it breaks up. The lower potash bed, averaging from 10 to 16 feet in thickness, occupies a larger area than the upper bed.

The equipment of the mines in Alsace is of standard type, similar to that of mines in the older developed potash fields of north-central Germany. As required by the German mining law, each mine consists of at least two connected shafts, a provision doubtless designed for safety in case of accident and to assist ventilation. The shafts are mostly lined with concrete except near the surface, where an iron collar is put down through the loose alluvial and water-bearing beds. The shafts are equipped with two elevator mine cages, appar-

ently of a standard type. The cages are double decked and carry a number of iron mine cars, in which the salts are brought from the mine. Open lights are used, as there is apparently no danger from gas. The rock temperature throughout the region is rather high (reported 42° to 48° C., equivalent to 107.6° to 118.4° F.), and comfortable working conditions are obtained by forced ventilation. The mines are dry except that in some places there is a slow seepage of water from the upper part of the shaft, where it passes through the valley deposits. This water collects in a sump and is removed from the mine in mine cars. Ordinary hand augers and electric drills are used, and the salts are blasted down. The blocks are sorted by hand and the waste is used to fill the spaces mined out. Some timbering is done, mostly in the main galleries, and one gallery was lined with concrete for a short distance from the main shaft. In general the workings stand well, unless the salts are removed in entirety, when large masses of the overlying shale are likely to break down with exposure to the air.

The workings in many of the mines have scarcely advanced beyond the stage of exploratory development, with the extension of main galleries to block out the reserves. In some places a room and pillar system of working has been tried, in which both the necessity of leaving some of the salts for a roof and the large pillars required considerably reduce the percentage of recovery. It is possible that some of this material may be taken out later. In other places a "long-wall" system of mining is employed, whereby a continuous working face is advanced and the space worked out is filled to the rear, generally down the slope, with waste broken out in mining and also with waste salts brought back in the mine cars from the refinery. Where the dip is steep the salts are mined in stopes in the usual manner. In many places the workings on the upper and thinner bed are reached through stopes from the lower level.

From present and past operations it seems fair to assume that each shaft may be counted as capable of bringing to the surface 600 to 750 tons of salts daily, which is equivalent to about 200,000 to 250,000 tons a year. As the crude salt will probably average on the whole about 14 to 15 per cent, and a smaller amount will be of 20 to 22 per cent grade, it seems fair to estimate the annual output of a single shaft if worked at approximate capacity as about 30,000 to 40,000 tons of K_2O. This is considerably in excess of the reported past production from any of the mines.

The broken salts that are brought from the mine are passed through a bin to a jaw crusher, where the coarser blocks are brought down to about the size of a man's fist, and the material is then spread on a revolving table, where it is picked over in a hurried way by one or several workers, who remove the larger blocks of waste that happen to come to the surface with the rest. From this table it is fed to a lower level into grinding mills, which are of several types. From these the material either passes into storage for shipment as crude salts or goes into the refinery.

If the material is to be refined, it is elevated and passed through a screen. The fines are relatively cleaner and purer, and the coarse material includes more shale, which is not so readily broken up in the mills. It is then transported, usually by belt, into hoppers, from which at intervals it is fed into boiling vats fitted with agitators. Here the raw salts are heated with liquors derived from pre-

Reichsland Mine, Wittenheim, Alsace.

vious crystallizations. The liquors and salts from these solution vats are discharged periodically, and the residue is drawn into draining vats which have perforated bottoms and revolving rakes, the latter assisting the draining of the residue while it is still hot. When the free liquor is practically all run off the residue is thrown out at the edge by means of the revolving rakes and goes to the waste, usually being returned to the mine to fill old workings. The moist residue still contains several per cent of potash.

The liquor goes to settling vats, where it stays about 15 minutes, beginning to crystallize on the surface almost at once. A long glass tube thrust into the solution, then closed at the top and withdrawn, shows the progress of settlement of the muddy slime, and a hinged drainage pipe is let down into the vat, so that its outlet end follows the rather distinct limit of the cleared liquid. At the last the mud and salt left in the bottom of the tank are again washed with hot mother liquor.

The liquor, which is still distinctly muddy, is drawn from the settling tanks through troughs to a battery of iron crystallizing vats of the ordinary type, where as it cools it deposits the crop of muriate (potassium chloride) of varying degrees of purity, the quantity and quality of the product obtained depending somewhat on the care with which the various steps of the process are conducted, the length of time allowed for crystallizing and the amount of chilling. After the liquor has stood for several days it is withdrawn and returned to the process. There is so much muddy sediment in the liquor that the final product has an earthy color. The salts that crystallize on the sides of the vats are fairly clean, but no effort has yet been made to take these out separately. The crust that forms with each cooling is from 2 to 5 inches thick on the sides of the tanks and somewhat thicker at the bottom. The salt is dug out of the crystallizers by hand and loaded over the sides into tramcars, whence it is taken to a rotary dryer for finishing.

The yield was reported to be a little better than 3 tons of crystallized salts per crystallizing vat. Thus a plant with 72 crystallizing vats, worked in three groups, would yield about 80 tons of refined product daily.

The mother liquors are used repeatedly, as the accumulation of undesirable constituents in them is slow. This is considered one of the great advantages enjoyed by this field, as compared with the German potash regions, where, on account of an excess of soluble magnesian salts in the mother liquor, much of it has to be discarded regularly.

The coal consumption at a plant with 72 crystallizers, producing 80 tons of refined salts daily, was stated as 13 tons a day in the refinery and about 7 tons more for general purposes in the mine, not including electric current used for lighting. The cost of coal was quoted at 56 francs per metric ton.

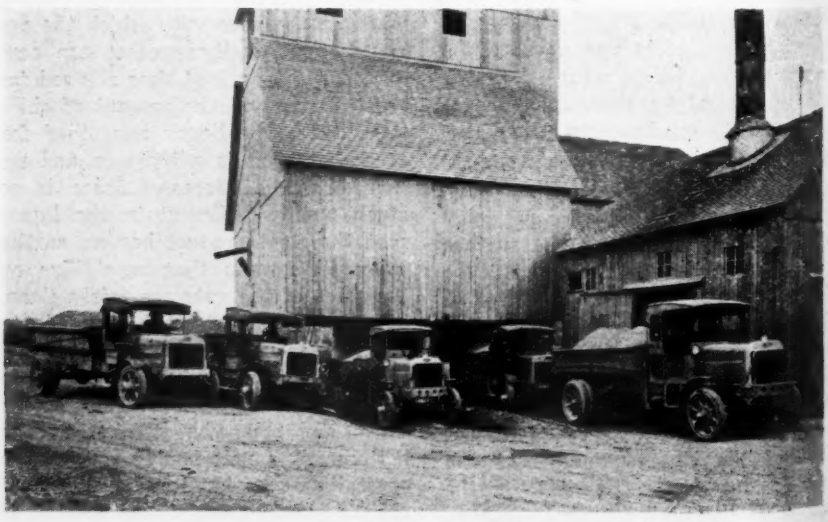
At Trona, Cal., near Searles Lake, the West End Consolidated Company is putting up a potash plant, which is expected to be in operation within the next twelve months.

The Lennient Lake Lumber Company of San Joaquin, Calif., has been awarded the contract for sand, rock, cement, lumber and other building materials for the James Irrigation District.

The Hackett Digger Company of Portland, Ore., is having new sand and gravel bunkers constructed at the foot of East Clay street, which will have a capacity of 15,000 cubic yards.

The Standard Sand & Gravel Company, Lillington, N. C., recently incorporated with a capital of $500,000, is planning for the immediate establishment of a new mining and washing plant, with initial installation to cost about $75,000. John A. Royal is president and manager.

The Farmers' Limestone Company, Huntington, Ind., with an authorized capital of $10,000, is a new company in the industry. They will grind or pulverize limestone for agricultural purposes. The directors are J. P. Shutt, Levi L. Ulrich and O. N. Lefler.



Fleet of motor trucks at an Ohio stone plant.

Relation of Lime to the Use of Fertilizers

By E. O. FIPPIN

Manager Agricultural Department, National Lime Association

LIME, using the word in the broad agronomic sense to include both burnt and carbonate forms, is one of the materials fundamentally necessary to create that condition in many soils under which commercial fertilizers are able to give their largest effect. The reasons why lime exercises such an underlying influence on the effect of fertilizers are:

First, it neutralizes active acids in the soil and thereby changes the chemical balance in a direction favorable to most of the crops that are agriculturally important, and especially for the clovers and alfalfa, and to a less extent for most of the grain, grass and vegetable crops. Similarly, this correction of acidity exercises a most significant beneficial influence on the microscopic plants in the soil that are concerned with fertility. Among these are the organizms that promote the decay of organic matter and the formation of that most valuable form commonly known as humus.

Second. It promotes the activity of those organisms that change ammonia into nitric acid, which is the form of nitrogen most acceptable to the crops commonly grown on well-drained soils. It is also necessary for the best growth of those organisms that have the power to fix the free nitrogen in the air in combinations that are suitable for plants. This includes both those organisms that live on the roots of legumes and those that live independent in the soil on the vegetable matter. This effect of lime materials to correct acidity, with the beneficial results that follow such correction, is perhaps the outstanding reason for the use of lime on soils, but it is by no means the only effect.

Third. There are instances where it seems evident that the use of lime materials supplies calcium or both calcium and magnesium to the plant for food purposes. This is especially true with plants of the clover-alfalfa type that use a large quantity of lime. In addition to this direct food function, lime maintains a condition in the soil that tends to increase the availability of the plant nutrients already present.

Fourth. The presence of a reasonable amount of lime improves the general sanitary condition of the soil by preventing the development or changes the character of many constituents that

E. O. Fippin

Speeding From Pit To Road Bed

Ross & Whelan, Inc., are now building a wide gravel road from Chestnut Neck to New Gretna, New Jersey, on Mullica River section of Route No. 4.

Two PLYMOUTH Locomotives are speeding the gravel from pit to road bed, each hauling a train of ten loaded cars, and each making a round trip every twenty minutes, over a mile and a quarter haul.

The contractors are loud in their praise of the PLYMOUTHS and say they are the biggest money-making feature of their equipment. The above train was snapped as it pulled away from the pit on its way to the dump. May we send you descriptive Bulletins?

PLYMOUTH
Gasoline Locomotives

THE FATE-ROOT-HEATH COMPANY
206 Riggs Avenue. *Plymouth, Ohio.*

Table I. Effect of Lime and Fertilizers on Crop Yields, and Net Returns at the Ohio Agricultural Experiment Station, Average of 13 Years

Plot number.	Treatment.	Corn. Grain bu.	Corn. Stover bu.	Oats. Grain bu.	Oats. Stover bu.	Clover Hay lbs.	Total Value of Increase.	Cost Treatment, Excluding Manure.	Net Gain or Loss per Acre.	Net Effect of Lime Material Alone.
15	Limestone, 1,780 lbs..	5.26	121	0.32	28	588	$4.76	$2.70	$2.06	$2.06
14	Caustic lime, 1,000 lbs.	7.74	461	2.63	218	771	7.88	3.00	4.88	4.88
6	Limestone manure, 1,780 lbs.	20.26	724	6.24	426	1156	16.11	2.70	13.41	3.81
3	Caustic lime, 1,000 lbs., manure, 8 tons.	19.48	728	5.72	329	1105	15.30	3.00	12.35	3.00
26	*Manure since 1909, 8 tons	17.34	816	3.58	202	715	12.30	....	....	....
17	Caustic lime, 1,000lbs.	20.13	829	5.40	202	1264	16.17	6.60	9.57	†3.57
	Acid phosphate, 320 lbs.	...	...	...	...	....	....	....	....	....
	Muriate of potash, 40 lbs.	...	...	...	...	....	....	....	....	‡6.80
21	Acid phosphate, 320 lbs.	14.78	611	3.14	176	413	9.60	3.60	6.00	....
	Muriate of potash, 40 lbs.	...	...	...	...	....	....	....	....	....
20	Acid phosphate, 320 lbs.	8.55	315	1.19	37	271	5.37	2.60	2.77	....

*Previous to 1909 a complete fertilizer was used.
†Over mineral fertilizer.
‡Over acid phosphate.

may depress crop yields. It also prevents certain plant diseases that thrive under acid soil conditions. Best known among these is the club root of the cabbage and related plants, the common remedy for which is an application of lime to the soil.

An examination of the experimental data in the northeastern states reveals the fact that very generally the presence of lime has increased the efficiency of both commercial fertilizers and stable manure over their effect without the use of lime.

At the Cornell Experiment Station in New York, in the study of the efficiency of different forms of lime, including both burnt and carbonate forms, on the succession of nine nonlegume crops, lime has produced an increase in yield on heavily fertilized land ranging from a few per cent up to 27 per cent. From other data where clover or alfalfa is included in the succession, the increase from the use of lime ranges from 50 per cent up to 300 per cent or more. A summary of tests throughout the southern section of the state involving the use of lime with acid phosphate and manure reveals an average increase of about 1,500 pounds of hay from the use of lime alone and 480 pounds of hay from the use of acid phosphate alone. The combination of lime with acid phosphate has produced an increase of 2,400 pounds of hay per year.

At the Ohio Experiment Station many years' results have been secured from the use of two forms of lime without and with fertilizers or manure. These are summarized in Table I.

One significant point in this Ohio data is the comparative effect of lime where different carriers of nitrogen are used. Where the carrier is sulphate of ammonia and an acid residue is left in the soil, lime has had

Table II. Effect of fineness on availability of limestone.

	1/8-1/12 inch.	1/20-1/40 inch.	1/60-1/80 inch.	Less than 1/100 inch.
Solubility in carbonated water	28	45	57	100
Value in correcting acidity	18	27	57	100
Value in the formation of nitrates	12	56	94	100
Value in the growth of plants	5	22	69	100

its largest effect, producing a total increase in value of $11.80 per rotation as compared with $4.51 per rotation where nitrate of soda has been the carrier of nitrogen.

On the Scottsburg field in southern Indiana on gray silt lime soil the investigations indicate that both phosphoric acid and lime are needed and by far the largest returns are secured where the lime is combined with the phosphorus.

In Illinois a summary of the investigations on three fields in the middle and northern parts of the state on the better soils shows an increase of $21.24 due to the addition of lime to a complete fertilizer, or an average of $1.77 per year throughout the entire period of twelve years. On the gray silt loam of the southern part of the state the addition of lime to a fertilizer of raw rock phosphate and potash has produced over a period of fourteen years a total increase of $79.84 or $5.70 per year.

Data of similar tenor have been secured at the experiment stations of Kentucky and Tennessee.

At the Rhode Island Experiment Station the use of burnt lime in connection with nine different carriers of phosphorus over a period of nineteen years and with a variety of crops, has produced an increase of $22.30 per acre due to the lime. Where double superphosphate was used the total increase was $194.70.

At the West Virginia Station, over a period of fifteen years, in which four crops of legumes, eight of grain, two of timothy and one of potatoes have appeared, the use of lime in the burnt form when added to a complete fertilizer of nitrogen, phosphoric acid and potash, has produced an increase of 6,265 pounds of crop over the same plant-food elements used alone. It is interesting to observe that at this same station the use of the same quantity of lime with manure has produced an increase in the same period of 17,210 pounds of crop over the yield with manure alone. This result is unusual, but commonly occurs where the soil is seriously acid. In connection with the last clover crop in the series, the use of lime with a complete fertilizer has produced an increase in yield in one year of 2,680 pounds of hay as compared with the use of a complete fertilizer alone.

The cumulative effect from the use of lime was shown by data covering a period of thirteen years at the Ohio Station, where the rotation is corn, oats and clover. The use of both carbonate forms and burnt forms of lime with and without commercial fertilizer or manure has produced consistent increases in the crops throughout the period. The effect from the burnt forms of lime has been at least as good as those from the carbonate form in equivalent quantity. Dividing the thirteen years in nearly two equal periods, it is found that the yield of all the crops is substantially larger in the second half of this period than in the first half, and the increase in the second period is particularly marked where lime material is used with commercial fertilizer or manure.

Data collected at the Pennsylvania

and New Jersey stations show a wide difference in favor of the finer materials. This fact is brought out by the figures in Table II.

In the above table the availability of 100-mesh material is taken as 100. From this it appears that when measured by the efficiency in producing the growth of crops, material of ⅛-inch particle is only 5 per cent as efficient as material having particles 1/100 of an inch in diameter.

Bearing on the extent of the need of lime, it was pointed out that in New York State at least 75 per cent of the agricultural land requires the use of some form of lime as an essential factor in the maintenance or upbuilding of its productiveness, and that the use of lime in some quantity is desirable on at least 90 per cent of the cultivated area. The need for lime is nearly, if not quite, as great in any of the states east of the Mississippi, and from data already presented by the agricultural experiment stations it is apparent that a similar need for lime extends west of the Mississippi at least as far as the eastern sections of the states of Kansas and Nebraska. Wherever the rainfall is high in the districts west of that section, lime is also likely to be required by the soil for good farm practice.

Lime with humus may be looked upon by the farmer and the fertilizer industry as the frame to a picture. The increases in yield that are possible from the use of fertilizer is the picture, but this picture does not show off to good advantage until it is framed by the proper application of lime and the presence of a reasonable quantity of humus in the soil. Since the use of lime is often necessary for the growth of those crops by means of which humus is best maintained, lime thereby becomes the foundation of this frame for the fertilizer picture.

It is up to the fertilizer trade to see that their fertilizer picture is properly framed in the hands of the farmer by the wide use of lime and the maintenance of humus in the soil. The keynote in the fertilizer trade, as in all other lines of commercial activity, is service as measured by the returns that may be secured by the consumer. There should be the most cordial cooperation between those persons concerned with the use of fertilizers and those interested in lime materials, and of both of these with all agencies concerned with agricultural practice.

Potash From Green Sands

The Eastern Potash Corporation of New York is building a plant to make potash and fertilizer from the green sands of New Jersey. These sands contain from 7 to 8 per cent of potash, and occur in large deposits in the states of New Jersey, Delaware, Maryland and Virginia.

Their plant is located on the Raritan River Canal near New Brunswick, and is accessible by both water and rail. It covers about eighty acres, and is designed to handle 1,000 tons of green sands a day and produce 20,000 tons of K_2O and 600,000 tons of residue per year. Connected with this plant is the largest lime plant in the world, containing ten 8 x 125 ft. rotary kilns, producing 1,000 tons of lime a day.

Limestone for this plant will be quarried from the company's quarries located in the northern part of the state, where it will be crushed and then shipped by rail to New Brunswick. The company also owns the entire capital stock of the Raritan Refining Corporation, a near-by company, which has a favorable contract to refine Mexican petroleum. The Eastern Potash Corporation will use the fuel oil from this company to operate its power plants and kilns.

A contract has also been let to build a brick plant to utilize the residue, which makes a fine lime silica building brick. Capacity of this plant is to be 500,000 brick per day, and it is so designed that it can readily be increased to 1,000,000 brick per day.

The New Brunswick plant is now about 60 per cent completed and it is expected to be in operation early next fall. The cost of the plant is estimated to be about $250,000.

Can You Afford to Waste Coal?

COAL at $12 to $15 per ton means a large item of expense as compared to the price formerly paid for power, when $5.00 per ton was a large price for a fair grade of steam coal. Not only is coal high priced at the mines, but it is difficult to secure an adequate supply.

These conditions mean that close attention must be given to coal consumption. Thus it is a great mistake to unload coal onto the ground and allow wagons and trucks to haul over the edge of the pile, grinding the coal into the ground, losing several tons in this manner during a season, the loss varying with the tonnage used.

Coal should be stored in bins or at least on a hard bottom. For this boards can be used, but with crushed stone or gravel a thin concrete pavement can be laid to take the coal. If it is possible at a small cost to protect the coal from the weather this should be done, as the heat units thus obtained from the coal will be greater.

The next consideration in saving coal is the fire-box and ash pan of the boilers. To use the ordinary grates under high power boilers means to waste coal, clog fires, and increase the labor cost of feeding them. There are on the market today grates that not only save coal, but with cheaper grades of coal as much heat can be obtained as with ordinary grate bars with the best of coal.

It must be understood that every time a fireman must open his firebox doors to use his slice bar or to clean his fire with rake or hoe, not only is heat being lost through the open doors, but many units of heat are going up the stack, as well as unconsumed coal in smoke. This means that a type of grate should be used that can be kept clean by some mechanical device without opening doors and sending unconsumed coal and heat units up through the stack.

Likewise the ash box should be kept clean and so constructed that this can be done easily and yet give the fire the full draft, for with a box overburdened with ashes and large clinkers there cannot be the proper draft.

To save coal, boilers must be kept clean and in good repair, the tubes should be kept expanded and the edges rolled, and above all leaks should be watched for and stopped at once.

Improved types of boilers mean the saving of coal. Boilers, like machines, cannot be purchased on price alone. Efficient equipment can never be sold by the pound, so that to purchase boilers there must be both knowledge and judgment. Many a plant in the country is paying a large coal bill because cheap boilers were purchased and installed.

It is quite surprising in visiting quarries and sand and gravel plants where boilers are being used to find an exhaust of steam blowing steadily away and cold water being forced into the boilers. This is direct waste of coal, for more coal must be used to make steam of the cold water, while it is possible to use the exhaust steam to heat the water pumping into the boilers hot instead of cold water. Even in summer this means a decided saving and in winter a greater saving.

These are some of the many ways of saving coal. Are you wasting coal in your operation?

The fourth plant owned and operated by the McGrath Sand & Gravel Company, was opened on August 4, at Forreston, Ill. It is a large plant and is equipped with all modern machinery used in an establishment of this kind. James W. and T. E. McGrath attended the opening, at which they report the breaking of a bottle of champagne over the prow of the first car load. The other three plants are located at Pekin, Mackinaw and Chillicothe.

Quarrying Silica Sand From Ledge Rock

By DANIEL J. HAUER

IT IS a common sight to see sand taken from a pit or bank, or dredged or pumped from a river or bay; but the man living in the mountains knows nothing of dredging but does know that ledges of sandstone can be made to produce a fine quality of sand, so that instead of the operator having a sand pit or bank, he produces his sand from a quarry.

There are a number of such quarries in the country today, and as the value of such propositions become better known, especially for producing high grade silica sand for glass making, the number of such quarry operations will increase.

The plant to be described is situated at Bowest, in Fayette county, Pennsylvania, on the Western Maryland Railroad. There are two outstanding features of the operation, one being the method of handling the cars from the quarry floor to the crusher plant, and the second the use of water to carry the sand from the plant to the railroad and loading it into cars.

There are three openings of the ledge, each really a distinct quarry. The height of the ledge varies somewhat, being from 30 to about 70 feet. The drilling of the ledge is done by a Sullivan tripod percussion drill, sinking holes to a maximum depth of 20 feet. This means that the ledges are brought down in steps, an old method of drilling and blasting, the holes being shot straight with 30 and 40 per cent dynamite.

The drilling equipment is completed with two Sullivan hammer drills that will carry about 4 feet of drill steel. These drills are used to block hole boulders, take up rough or uneven places in the quarry floor, and for shallow holes on the ledge.

The stone from each quary is not kept separate but is mixed by being dumped into a bin, before going through the crusher.

The blasted and sledged rock is loaded into 2-ton mine cars of low type as shown in Fig. 1. These cars dump through the bottom. The cars are built of timber and are equipped with hand brakes so that they can coast down grade under the control of a man.

As the men load the cars against the breast of the ledge they are allowed to coast down from the quarry floor to the top of an incline, which has a grade of about 30 per cent. The tracks from all three quarries converge at the top of the incline. It is to allow these cars to coast to this point that the cars are equipped with brakes. When the empties are returned to

Fig. 1—The sandstone ledge, and type of car used.

Fig. 2—Drum used for lowering and raising car upon incline.

the top of the incline, they are hauled to the loading tracks in the quarry by means of a horse (see Fig. 2).

At the top of the incline is located a large wooden drum built on a steel frame 6 feet in diameter. This drum is controlled by a brake with a long lever. An endless cable, or to be more exact a cable with both ends running off the drum, each being attached to a car, the loaded car being at the top of the slope and the empty at the bottom, allows the weight of the loaded car to coast down the steep grade under control of the man at the lever, and this loaded car brings up the empty.

In Fig. 3 is shown the track arrangement on the incline, rails being saved on each end, but a double track being used to allow the cars to pass one another on the incline. The operation of the two cars on one cable allows this arrangement of tracks without the cars interfering with one another. This is a cheap method of raising and lowering cars on an incline. It has been used for years in Pennsylvania in pits, mines and quarries. Many of the drums are built at a local blacksmith shop. The writer remembers seeing these drums used when a boy.

In Fig. 4 a second arrangement of track is shown, when three rails are used at the top and bottom. This method saves a rail over two separate tracks, and the curves are not as sharp as in Fig. 3.

The incline is on solid ground, but the bottom of the track runs on a trestle. Under this trestle is a bin with a sloping floor. The stone is dumped through the bottom of the cars into the bin, and is fed by gravity from the bin into the crusher.

Fig. 5 gives a view of the crushing, grinding and washing plant. Over the top of the building can be seen the trestle from which the cars are dumped into the bin which adjoins the building.

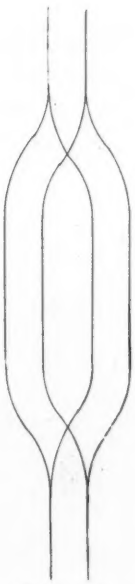


Fig. 3 — Arrangement of track on incline.

Fig. 4.—Arrangement of track for incline, with three rails at top and bottom.

Fig. 5—Crushing, grinding and washing plant.

The crusher is a 14x16-inch Blake jaw machine and is operated by a Westinghouse 30 horsepower motor. The entire plant is electrically operated, the power being furnished by the West Pennsylvania Power Co. A Sullivan air compressor, operated by a Westinghouse 25 horsepower motor, furnishes air for the drills in the quarries.

Fig. 6—Flume carrying sand from plant.

After the stone passes through the crusher it goes by gravity into a large circular grinding pan, water being furnished to the grinder by a pump located below the railroad at the Youghaheinny River. A 40 horsepower Westinghouse motor operates the grinding pan and the two screens, one located on each side of the pan. From the pan the sand passes into these screens, in which water again plays upon the sand.

From the screens the sand goes into the washer. This consists of three double troughs each with a screw conveyor in it, set at an angle of 30 degrees, so that the sand is elevated and washed at the same time. This elevating is necessary in order to obtain gravity to carry the sand from the plant to the railroad, a distance of about 350 feet. The washer is operated by a 75 horsepower motor manufactured by the Burke Electric Co. A boiler is also located in the building, it being used to heat the plant during the winter months. Over the crusher is placed a Harrington triplex chain hoist, used to replace jaws and make repairs to the crusher.

The machinery for this entire plant was furnished by Phillips and MacLaren of Pittsburgh, Pa.

The sand is carried from the plant to the railroad in a cheaply constructed yet efficient flume. This flume can be seen running from the building in Fig. 5. A top view of the flume is also shown in Fig. 6, which is an excellent view showing the blaffles placed on alternate sides, 6 inches apart, that keep the current of water so stirred up that the sand is not deposited in the flume but is car-

Fig. 7—Loading a car of sand by means of water.

ried along by the water. This is one of the best money saving features of this plant, as the cost of transporting the sand and loading it into cars is almost nothing.

In Fig. 7 is shown the outlet of the flume, loading a flat-bottom gondola, the man's duty being to keep the sand from flowing off the car and to move the car ahead as it is being loaded. Box cars are also loaded by means of water. The end of the flume is run into the open door of the car and a trough attached to the flume chutes the sand into either end of the car. A couple of boards nailed across the car to the sides at the door, allows the water to run out and retains the sand. One man can load a box car by this method, certainly a cheap operation.

Water is furnished for the entire plant by an electrical pump, manufactured by the Yough Pump Co., of Connellsville, Pa., and operated by a 25 horsepower Westinghouse motor.

The sand from this plant is sold to glass manufacturers, to steam and electric roads for engines and motors and also sold for building purposes.

A blacksmith shop is maintained at the plant for making repairs and building the quarry cars. A tramway is used from the railroad to carry supplies to the mill and quarry. A flat car on this tram is operated by an upright hoisting engine manufactured by Thos. Carlin & Co., operated by compressed air.

In operating in the quarry, besides the overburden there is on top of the ledge some sandstone that is so fine grained that if it was crushed the grains would dbe washed away. Hence this goes to the spoil bank. This spoil is all carried away in one-horse dump carts. One of the spoil banks can be seen in Fig. 2.

This sand quarry is operated by the Yough Sand Co., of Dunbar, Pa., Mr. Frank MacFarland being president. Mr. George Clements is superintendent.

The Utica Sand & Gravel Company, Utica, N. Y., has filed a certificate of consent of the firm's stockholders to an increase of the capital stock from $10,000 to $25,000. It is stated that the amount of the original stock issued is $6,000.

The Augusta Silica Mining Company, Campbell Building, Augusta, Ga., recently organized with a capital of $50,000, will develop a sand and gravel tract near the city. Dredging equipment and other machinery will be installed on the property, with intention of producing on an average of about 15 carloads of material daily. George W. Summers is president, and F. P. Farrar, secretary-treasurer.

Announcements are made that the Lehigh Portland Cement Company has purchased 93 acres of land on which are beds of limestone at Tarrant City, a few miles removed from the city limits of Birmingham, Ala., and a large cement plant is possible. The Marquette Cement Manufacturing Company, Chicago, has options on a site for a large cement plant, it is stated. John C. Barker, assistant to the president of the company, is making personal investigations into possibilities of this district.

News From the Coast

Items of Interest Among Material Men Along the Pacific

By Our San Francisco Correspondent

BUSINESS in the gravel industry and in building supplies is good. Prospects for fall business are better. Building and road work in San Francisco and on the Pacific coast are keeping pace with other industries which are enjoying a good share of prosperity. Many hotels and theatres are being constructed and planned in almost every city and town. Brick and concrete are the choice of a large number of owners.

Macadam roads seem lately to have become more in favor than during the past few years, when paving almost monopolized the choice of material for roads. The car shortage has eased up a little and sand and gravel men are working at top speed to produce a maximum in order to keep pace with the growing demand. There is also a good prospect of money for bond issues loosening up.

Material for the construction of county highways is to be shipped to Martinez by boat in order to help solve the car shortage problem, it has been arranged by the county surveyor of Contra Costa county.

It was feared for a time that it would be necessary to halt construction on two highway units leading into Martinez, but it is thought that steamer transportation of the road materials will solve the difficulty. The material will be taken to the various highway jobs by motor truck.

Directors of the Chico Chamber of Commerce will oppose the recent action of the board of supervisors in appropriating $80,000 for the construction of nine miles of gravel road from Biggs to Princeton, a rice-growing district.

Under a bond issue recently voted $130,000 was appropriated for a permanent road. Speaking at the meeting of the board of directors, W. B. Dean, chairman of the good roads committee, said that "spending public money for gravel roads is like pouring sand in a rat hole." Construction of a permanent road under the bond issue is now prevented by high building costs. The matter is to be definitely decided at the next meeting of the board some time in August.

More than $20,000 has been spent in making preparations for road building by Butte county without any actual highway work being done. The county treasurer has sold a $500,000 block of highway bonds. A bond issue of $1,800,000 was authorized at an election last December.

The low bid for construction of 13 miles of county highway has been submitted by the Clark & Henery Co. for the Brown's Corner to Esparto link of the Yolo roads, at an average of $20,371.30 per mile.

A. Teichert & Sons submitted the lowest bids for construction of the Winters to Davis link, 9.7 miles in length. The Washington to Bryte unit of 2½ miles will be done by the McGillivray Construction Co. The low bids were for a type of road calling for a 3½-inch base of asphaltum and concrete and a 1½-inch Topeka wearing surface.

Monrovia, Cal., is buying 600 tons of crushed stone to be used in construction of a new reservoir. Crushed rock, gravel surfaced roads are being constructed in many districts throughout Idaho this summer.

The Southern Silica Mining & Mfg. Company, Main Street, Columbia, S. C., has acquired additional sand properties in the vicinity of its present plant, and will install new operating and loading machinery for early operation. It is proposed to increase the total output of the combined plant to about 40 carloads per day.

What of Next Year?

New York Writer Analyzes Present Conditions and Their Effect on Future Business

BUILDING material price reductions in New York at the close of August forecast a still greater complication of the construction situation next year, according to the Dow Building Reports.

There is no worthy opinion among building construction interests that does not earnestly hope for an early, permanent price readjustment downward for all building construction commodities. But price reductions when there is absolutely no change in the supply of materials at manufacturing points and with potential demand already absorbing all the available building material supply for the remainder of this year, can have only one effect: the skyrocketing of prices, counter-bidding evils so far only tasted, delivery delays, premium baiting and snowballing of wages next year at least.

The real perspective of the latest turn of events in the leading distributing markets can be viewed from the two extremes of the industry, namely; the source of supply and the ultimate consumer. The temporary present sag is in the mean that lies between these two extremes, namely in the handling and transportation department; but being palpably merely a temporary slump, the ultimate effect upon the building situation is all the more harmful:

New and second-hand brick, wood lath, shingles and certain kinds of flooring represent the weakest sections in the price situation so far, but there are other departments that are likely to feel the effect of the waning market by reflection in price pruning at least for desirable business.

Expressed tersely, the falling off of new construction work has curtailed demand. Dealers, unlike those in other lines of commerce, are without stocks. Their storage sheds are literally bare. Deliveries are made to jobs direct from incoming cars and lighters and ships. The goods seldom pass through the distributors' yards. But the dealers have not been able to get shipments from the manufacturers on orders placed a quarter to a half year ago, and to make sure of adequate supply when the building movement finally gets under way, they are ordering far in excess of their normal requirements, mostly without cancellation privilege.

The mere fact that deliveries have been hampered and retarded even worse than they were during the conscription of tracks for war needs, has effectually shut down construction projects so that new construction above Ninety-sixth street is stopped, except for work that is being finished up. There is plenty of commercial building, in so far as materials delivery will permit, and much alteration work, but mostly away from structures designed for dwelling purposes.

If the present tendency toward weakened market for basic materials and lower prices results from compulsory price cuts by holders who have a desire to dispose of excess products in an attempt to force a market for commodities or to stimulate buying at a time when conditions are so adverse to construction work of all kinds it will not fill up dealers' yards when railroad embargoes continue to be declared as in the case of some of the railroads terminating in New Jersey today, when lighterage is deferred, necessitating expensive trucking, any faster than the yards have been able to fill up.

General price cutting as a temporary expedient will have the immediate effect of closing down manufacturing plants. Under the existing

credit curtailment the mills are being financed out of their own resources or from current sales. Let the sales stop and the mills will immediately cut off the operating overheads, make deliveries on back orders and await a more stable market before resuming.

Under such a condition, the building market of next year will be once more undersupplied with materials, just exactly as it is now undersupplied, and with construction work on a clearer path as far as finance and legislation are concerned, the present ragged condition of the building material price levels will be much more aggravated. Exhibits are at hand to show that this situation is already being molded.

Prospective builders will take brief comfort in any current sign of price curtailment. Those who have desirable business can probably obtain advantages in shading because the market is unquestionably hungry, and while legislatures and investigators ponder, it is getting hungrier, but commercial buyers, not home buyers, will reap the benefit.

Right to Fix Royalty

Oregon Law Requiring Payment for Gravel from Streams Is Upheld

THE right of the state land board to fix a minimum royalty for sand and gravel taken from the beds of navigable streams within the state under the act of the 1919 legislature is upheld in an opinion handed down by the Supreme Court of Oregon.

The opinion dismisses the original proceedings in mandamus brought by the Salem Sand & Gravel Company in an effort to compel acceptance of their bid of 3 cents per cubic yard for sand and gravel rights in the Williamette river at Salem, the minimum price fixed by the state land board being 10 cents per cubic yard.

From Scows to Cars

Device Used by a Pennsylvania Producer for Rapid Handling

THE device here shown is operated by the Rock Point Sand Company, Wampum, Pa., and was designed and built by C. C. Whiteside, general manager of that company.

Its purpose is to take sand directly from the scows as they come down the river from the dredges and load it onto cars, all in one operation.

As will be seen, it consists of two main towers, supporting the head of the elevator, a hopper, and a chute

Delivery to cars

from this to the car track. The outer end of the elevator is suspended from a supplementary frame, so that the height can be regulated as desired. A platform carries the engine and hoist and provides working space for the operator.

The elevator consists of standard steel elevator buckets fastened to old

Scow unloader of the Rock Point Sand Co.

dredge chains. A chain which has been used so long on a dredge as to be unsafe for this purpose can still be utilized on a device of this kind.

A back line over a single-drum hoist is attached to the scow when it is brought up, and serves to hold the scow in place and draw it along as the sand is taken out, keeping the elevator continually against the load.

The H. C. Brooks Company, Martinsburg, W. Va., is planning for the development of limestone quarries near the city. The production will be devoted largely to crushed stone for road building service.

Notes of the Eastern Producers

Our Correspondent Reviews the Trade Over a Wide Territory

WHILE the outlook for future construction operations is not exceedingly bright in eastern districts, a condition rather general throughout the country, current business in building materials is good, and sand, gravel, crushed stone, cement and similar commodities are engaging under a firm call—a call that is really too strong for some dealers, because available stocks are not sufficient to answer the demand.

Prices hold firm, despite the growing indications of a slackening in building construction. This is contrary to what might be expected, and moreover, there is every belief to forecast still higher levels for high grade materials with the turn of the fall season. In the line of cement, the advance has already ensued, and those well informed say that the "peak" has not, as yet, been reached.

Transportation conditions show marked improvement. Supplies are being received in the eastern cities in fairly good allotments, and with the advance in freight rates, it is held that the situation will show constant improvement, although car shortage is not a matter that can be overcome in a day, or a week, or a month.

Good quality gravel, 1½ and ¾-inch sizes, holds at $3.00 per cubic yard in wholesale quantities. Dealers at New York and vicinity are asking $4.25 for the material, delivered, and sizable quantities are being turned at this figure. Sand is selling at $1.50 per cubic yard in carload lots, and delivered, at $2.75 to $3.00, depending on the length of haul. Fine grade white sand is fetching $5.00 a cubic yard, delivered on the job. Crushed stone maintains at the same levels as prevailing during recent months, or $2.00 per cubic yard for 1½-inch stock, and $2.15 for ¾-inch material, wholesale; dealers are selling both sizes for $4.00 a cubic yard delivered. Portland cement has reached a level of $5.10 per barrel delivered at New York and vicinity, with a bag rebate of $1.00. This material is operating under a particularly active call, and dealers with fairly good stock certainly are not "worrying;" offers for "all on hand, spot cash" are frequent occurrences.

The John Jones Slate Company, Rutland, Vt., has completed the electrification of its local quarries, and in the future all equipment will be operated by electric power, delivered by the central station, instead of steam, as heretofore. This includes hoisting motors, air compressors, centrifugal pumps and other equipment.

Owing to the high figures submitted by granite contractors for material for the new court house at New York, it has been decided to use limestone in place of granite, affording a saving, according to bids tendered, of about $125,000 in the job. In the local building stone market, dealers are quoting Indiana and Kentucky limestone at $1.55 and $1.85 per cubic foot, respectively, and seam-face granite at $1.25 per square foot.

The Reservoir Quarry Company has been organized at White Plains, N. Y., with a capital of $25,000 to operate local stone properties. The company is headed by C. W. Knowles, U. M. Austin and R. M. Hart, all of White Plains.

The Albany North River Moulding Sand Company, Albany, N. Y., has been reorganized for proposed expansion in operations, with capital of $10,600.

To operate limestone properties in the vicinity of Watertown, N. Y., the Richville Limestone Company of this

place has been organized with a capital of $30,000. Extensive quarrying will be carried on for large production. The company is headed by F. C. Ash, C. W. Campbell and D. W. Balmat, all of Carthage, N. Y.

The St. Lawrence Quarries, Gouverneur, N. Y., have filed notice of dissolution under New York laws.

George Brown & Company, Newark, N. J., prominent in the stone business in this section, have completed plans for the erection of a new one-story machine shop at their yard, 278-80 Ogden Street, to be brick and steel, 34x100 feet.

The Lily Stone Company, Camden, N. J., has been organized with a capital of $25,000 to operate properties in this section. T. P. Curley, Ludwig Jaster and R. S. Ayres, Camden, head the company.

The Penn-Allen Cement Company, Commonwealth Building, Allentown, Pa., has secured a controlling interest in the Industrial Limestone Company, Bethlehem, Pa., and in the future will direct the operations of this interest; offices will be removed to Allentown. The company acquired has a large quarry at Steubens, near Bath, located on the Lehigh & New England Railroad; the production includes high grade limestone, as used in cement manufacture; crushed stone for concrete construction, road work, etc.; and a number of lime kilns for the manufacture of hydrated lime. It is said that the new owner plans to increase the output at the plant. Officers have been elected as follows: W. E. Erdell, president; E. A. Wolfe, vice-president, and H. E. Hess, secretary and treasurer.

The well-known Conshohocken stone quarry, Conshohocken, Pa., operated by Charles Hanson, will be abandoned for stone production, and plans are under way for the utilizing of the site for manufacturing plants. Surveys have been made for a division of the property.

The demand for stone has grown so keen in the vicinity of Columbia, Pa., that steps are being taken for the reopening of abandoned properties in this section. One of the old quarries east of the city is now being emptied of water and will be started up at an early date.

The Lemoyne Quarries Company, Lemoyne, Pa., has increased its capital to $29,800, for general expension.

The Millard stone quarry, King of Prussia, near Norristown, Pa., is operating at good capacity, and large shipments are leaving the plant for road construction and other work.

The Rock Hill Quarry Company, West Manayunk, Pa., has been organized with a capital of $35,000 to operate stone properties in this section. Walter D. Bryson, Ridley Park, Pa., is treasurer of the company.

The Bethayres Quarry Company, Fox Chase, Pa., has been formed with a capital of $5,000, to operate local stone properties. William E. Strock, 7353 Oxford Avenue, Philadelphia, Pa., is treasurer.

The Pennsylvania Sand & Gravel Producers' Association, Pittsburgh, Pa., has filed a complaint with the State Public Service Commission against the rates of twenty railroad lines in the western part of the state, asking for a review of the schedules, holding that such are not on a uniform basis, and are preferential.

Practically the entire fleet of boats of the Rodgers Sand Company, Pittsburgh, Pa., is now in operation; two of the vessels are towing regularly from the company's sand diggers in the Allegheny River, while another boat is towing from Ambridge to the Rodgers plant. J. Herman Rodgers, general manager of the company, returned early in August from a vacation trip to Michigan.

Will Not Tax Itself for More Roads

Indiana Special Session Takes No Action on Bill—Car Service Closely Watched

By Our Indianapolis Correspondent

THE industry in Indiana was given a blow by the special session of the state legislature. The blow was indirect but its effect was none the less felt. Sponsored by the Indiana Highway Commission a bill prepared which would provide for the construction of approximately $25,000,000 of improved roads in Indiana next year. The state highway commissioner desired a levy of about 30 cents at first, but this finally was cut down to 20 cents and additional revenue was to be raised by doubling the automobile license fees in the state. It was thought the doubling of these fees would create a fund of $5,000,000 which might be used wholly for maintenance work, leaving the other funds raised by taxes and federal aid intact for improvement. After the legislature convened an investigation showed a marked sentiment against any increase in taxes and the bill never was put to the test of a vote. However, it is almost certain that some similar bill will be introduced at the next regular session to be held in January.

During the past month there has been a noticeable increase in the amount of common labor available. This is certain to help the industry. During the early months of this year it was almost a human impossibility to secure common labor that would do a day's work for a day's wages. The condition now is changing and the industry is experiencing less and less difficulty in getting men. The men that are on the jobs now are showing an increasing tendency to do more work and to work more often. It is thought that the curtailment of production among the industries through the central section, especially the automobile industries, which have laid off hundreds of men within the past month, has had some effect on the labor market. While the industry dislikes seeing any other industry compelled to curtail production, yet these same factories with offers of large bonuses short hours, transportation to and from work, extremely high wages and all that, have contributed not a little to the general "touchy" attitude of the laboring man.

The announcement that the interstate commerce commission is keeping in close touch with the car situation in Indiana leads the industry to the belief that Indiana may have better car service in the future. A telegram was received recently by John W. McCardle, vice chairman of the public service commission, from the Federal commission, announcing the fact that the car situation was being closely watched in the Hoosier state. Mr. McCardle had sent a telegram pointing out the serious shortage here. The Indiana commission is making an effort to secure a blanket order from the Federal commission diverting a large number of cars into the Indiana territory.

Hookers, traveler runners and laborers at Bedford and Oolitic stone mills went on strike July 22 because of dissatisfaction over their wage scale. Planermen and cutters may be compelled to quit work because they can not work without travelers.

Announcement has been made that the state highway commission has purchased a gravel pit near Roll, Ind., and will use the gravel in the maintenance work of the commission in the vicinity. The pit contains about 50,000 cubic yards of gravel.

Cement Earnings Improve

International Company Profits 81 Cents a Share in First Quarter Against $1.21 for All of 1919

THE consolidated profit and loss statement of the International Cement Corporation for the three months ended March 31, 1920, shows net profits of $225,346, equivalent to 86 cents a share on 261,052 shares outstanding, after allowing for the outstanding minority interests in subsidiaries. Profits were $317,603, or $1.91 a share on the stock, for the year 1919. The report follows:

	First quarter of 1920	Year 1919
Sales, less discounts, allowances, etc:	$1,500,348	$4,492,624
Cost of sales.	1,024,806	3,435,732
Manufactur'g profit.	475,541	1,056,892
Selling, administrative and general expenses	194,691	386,732
Gross profit.	280,850	670,160
Miscellaneous income	11,256	72,878
Net profits	$ 292,106	$ 743,038
Interest, taxes and miscellaneous charges	66,760	425,434
Net to surplus...	$ 225,346	$ 317,604

President Struckmann says: The market situation in all the territories served was good, and in order to meet the increasing demand for cement in Cuba it was found necessary to increase the marine equipment by adding three barges at a cost of approximately $100,000. During the quarter the operation of all the plants progressed normally, except that shipments of cement from Cuba were materially decreased on account of the severe harbor strike at Havana, thereby reducing profits for the quarter. Present conditions indicate continued activity in the building industry which should enable us to sell our entire production on a profitable basis.

The International Cement Corporation at present owns 96.5 per cent of the preferred stock of the International Portland Cement Corporation; 97.9 per cent of the common stock of the International Portland Cement Corporation; 94.5 per cent of the capital stock of the Cuban Portland Cement Corporation; 100 per cent of the capital stock of the Texas Portland Cement Company, and 100 per cent of the capital stock of the Uruguay Portland Cement Company.

Operations of the Uruguay Portland Cement Company were started in July, 1919, and were successful from the start. The operations of the Texas Portland Cement Company during 1919 gave great satisfaction, not only from the standpoint of production, but also of profits from operations.

From Over the Border

Outstanding Features of the Building Supply Industry in Canada

By Our Toronto Correspondent

THE dominant factors in the building and construction industry in Canada are still the scarcity of materials and the high costs of materials and of labor. Large works are being undertaken only when regarded as absolutely essential, the fact that all large contracts are on a cost-plus basis being another restricting influence. Road materials will probably be most in demand this year and next, if the immense road-building program of the Dominion and provincial governments are carried out. There is no prospect of much railroad work, and the uncertain business outlook will prevent the erection of some manufacturing plants. The amount of houses built depends upon the relation of values to building costs.

Hearings on the application of the Canadian railways for increased freight rates are now being given by

the Board of Railway Commissioners for Canada. The increase asked is 40 per cent and users of building supplies have been greatly concerned as to the effect such an increase would have on their costs. Most of them regard a moderate increase with favor, but desire to have present contracts sufficiently protected by delaying the application of new rates until about November 1st.

Information regarding the supply of building materials in different localities is being collected by contractors in Canada, with a view to obtaining priority shipments of coal. The present scarcity of coal is hampering the production of cement, brick and steel products. Cement now costs around $6.50 per barrel in Ontario and Quebec, whereas the price when some still uncompleted contracts were made was around $4. One effect of this scarcity has been that Alberta cement is now being shipped to Ontario for the first time. The Exshaw Cement works, near Calgary, Alta., recently received an order for 100 cars from the Toronto Hydroelectric Commission.

Plans are now under way for the reduction of the tar sands along the Athabaska river in Alberta. In addition to gasolene, fuel and lubricating oils, it is thought that bitumen and tar could be obtained on a commercial basis. The rapid increase in the price of the products now makes this possible, and the discovery of a local supply of natural gas has to a large extent solved the fuel problem, which was another barrier to development.

Building permits in June, for the fifty-five cities of the Dominion totaled $13,295,041, compared with $12,155,879 for the month of May, and with $7,577,346 for June, 1919.

With a quarter million capital the Logansport Stone & Lime Company, Logansport, Ind., was incorporated recently.

Buffalo House Shortage

This Brings Business to Material Men—Bigger Jobs in Sight

By Our Buffalo Correspondent

BACK of housing facilities in Buffalo and the consequent extensive remodeling of older single residences into flat houses and apartments are keeping the wheels going round for dealers in builders' supplies in this city at present and sand, gravel and other men who furnish the supplies report conditions of the trade very good.

The gravel situation here at present is very good, as contractors are rushing things to get their materials shipped ahead of the proposed increase in freight rates.

"Yes, things look very good for us just now," said D. Hyman, at the head of the Buffalo Gravel Corporation, when seen by a representative of Pit and Quarry. "Fortunate the car supply on the railroads is fairly plentiful now, although of course it could be bettered. However, there is no such scarcity of cars nor so much delay in moving shipments as last spring, when first there were no cars and then, later, what cars there were could not be moved with any degree of expediency because of the two unauthorized switchmen's strikes here."

With the exception of the big plant of the Dunlop Tire Company of London, England, under the name here of Dunlop, America, Ltd., being rapidly pushed at the River road site, there are few large contracts now under way, but with the great number of smaller repair jobs, alteration jobs and considerable street improvement work, the trade is kept out of the doldrums and going very well.

"Altogether, we are having a very busy month," said Mr. Hyman.

The larger part of the repairs and

alterations consist of meeting the situation mentioned earlier in this report. With Buffalo already crowded with requests for information from outside regarding chances for newcoming families to get roofs to cover them and with vacant houses or flats as scarce as Chinamen with full beards, things have reached an acute stage. It is not considered that new building will take much of a jump this fall, but it is hoped that by next spring a reaction will set in and that conditions may be relieved. The housing situation is now engrossing the attention of not only the municipal authorities of the city, but the state-wide situation will probably be considered at a special session of the legislature called by Governor Smith to be held in September.

Because of the opportunities seen by those owning large single residences, hundreds of these are being remodeled, added to a bit and transformed into two and even three-apartment houses, thus making greatly increased rentals from the same piece of property. All of these alterations and enlargements mean added supplies needed to be furnished by the sand and gravel men.

With the completion of the Dunlop plant next year, it is expected that from 5,000 to 7,000 hands will be employed. Therefore, the building of this plant alone and the vast supplies needed in its construction may be considered in conjunction with the fact that there will have to follow much building to accommodate the large numbers of families it will attract to the city.

Added to this comes the announcement that next spring will be begun the construction of a $5,000,000 concrete elevator, docks and a breakfast food plant on a Buffalo creek site, near the lake front, by the Standard Milling Company.

This is an attractive looking job in the eyes of the men who handle sand, gravel and kindred supplies in the building line, as the entire construction will be of concrete, not a stick of timber to be used, in an effort to make the plant, docks and all absolutely fireproof. The construction of this plant is expected to consume a year's time.

With its plant of many buildings partly completed, the Pennsylvania Rubber Company stopped operations. Later it developed that the DuPont interests have purchased the site and completed buildings and will continue building operations and conduct a large silk fibre plant here. Continuation of work on the plant will be started soon.

At present there is a great shortage of cement in this city. There is absolutely no cement in storage here now, although normally there are at least 20,000 barrels in reserve. Part of this is caused by shipping conditions and car shortage, while coal shortage at the cement-making plants also accounts for much of the discrepancy.

Little state road work is being done in this section of the state outside of some repair jobs. This lack of road construction is due both to the fact of the cement shortage and because it is impossible to get labor for the work.

Crushed stone and gravel are both in abundance in this section, so that shipping conditions do not affect their supply. Here the motor truck plays its part. The bulk of crushed stone used here in street work is hauled in by motor truck from quarries near Williamsville, a few miles beyond the eastern city line, while the bulk of the gravel used by the sand and gravel companies here is gotten in scows from Squaw and Strawberry islands and other points in the Niagara river. This is also hauled by motor trucks from where it is delivered at the docks.

Building Resumed as Money Eases

Transportation Situation in Texas Is Reported Much Better

By Our Correspondent at Dallas, Texas

THE sand and gravel market at Dallas and other Texas cities, which has been somewhat slow for several weeks on account of a letting up of the building operations due to the restrictions of loans by banks, is again improving. Building operations are being resumed, and it seems that the money stringency is passing. Road contracts, which had been held in abeyance on account of prevailing high prices of road building material and also because of the scarcity of cement, are now being carried and the demand for gravel from that source is rapidly increasing.

Much improvement is also reported in the transportation situation, and more cars are now available for the transporting of sand and gravel than have been available for some time. Many large orders for gravel that had been unfilled because of the inability of gravel companies to get cars are now being filled and much road work and building is now being done.

Gravel companies in Dallas report an increasing local demand, and much of the gravel is being delivered from the gravel pits to the job by motor trucks. The West Dallas Gravel Company, R. J. Estep & Co., the Clem Gravel Company and the Trinity Gravel Company, all report considerable improvement in local business. All these companies maintain fleets of motor trucks for delivery of gravel from their pits near Dallas to the works in Dallas and adjoining territory. No long hauls are undertaken, but gravel for road work and in the small towns within a radius of thirty miles is frequently hauled.

The J. Fred Smith Gravel Company, which delivers exclusively by rail, also reports improving business. This company owns several large gravel pits near Dallas, all reached by spur railroad lines. The gravel is loaded direct from pit to railroad car by means of steam shovels and drag lines. Much of their product is shipped to nearby towns and counties for building operations and for road work. This company has also shipped out much gravel for railroad ballast. The gravel from this company's pits is of proper content for concrete mixture, and it frequently is used in making concrete without further handling than dumping into the concrete mixing machines.

One of the recently developed gravel and sand shipping points in Texas is Colorado, and it is reported that an average of five carloads of gravel and sand a day is now being shipped from that place. Shurtleff & Roddy, sand and gravel contractors of that place, last week shipped 35 cars, and the report is that they are now more than 200 cars behind in making deliveries. This company is furnishing sand and gravel for several large paving contracts and also for other construction work. Paving at Eastland, Cisco, Stamford, Winters, Midland and Lubbock is being laid with gravel from Colorado furnished by this company. The large dam on the Deen river near Eastland, which will impound water for supplying that town is also being built with gravel furnished by this company.

This sand and gravel is sold f. o. b. cars at Colorado for $2 a yard.

Prices for sand and gravel in Dallas and other Texas cities seem to have changed little. The price f. o. b. cars seems to range around $2.50, while the price delivered on the works varies greatly, depending on the length of the haul.

Local Demand in Louisville

Building Boom Will Call for Much Material, Irrespective of Car Shortage

By Our Louisville Correspondent

THE best news from this section of the country right now is in that there is something of an industrial building boom on, one which may increase the local requirements sufficient to make up for some of the curtailment in trade with the surrounding territory because of car shortage.

For a-while it looked as though fall trade would wind up dull and slow, but suddenly there springs up evidence of an industrial boom in Louisville proper which spells good news especially for the sand and gravel people. It started last month with the purchase by the L. & N. Railroad of 588 acres of land south of town on which it is said that probably $10,000,000 will be spent in constructing terminals; but that was only a start.

Next comes the Belknap Hardware & Manufacturing Co., one of the greatest hardware concerns of the world, which sometime ago bought the old Gault House on Main street in Louisville, and is now planning a 12 or 14-story warehouse on the site.

The Ewald Iron Company is planning to spend about $3,000,000 enlarging its rolling mills here, the Shuler Axle Manufacturing Company is making arrangements for an enlarged plant, and the Henry Vogt Machine Company is also planning additions.

The Kentucky Wagon Manufacturing Company has recently bought considerable acreage adjoining its present site and will spend a million dollars or more enlargnig its plant presumably mainly to increase the facilities for manufacturing automobiles and motor trucks.

A new concern planning a plant is the Kentucky Tire and Rubber Company, which has plans to build a plant costing approximately $700,000.

In addition to all this, there is another local movement on tap in which it is planned for business men to raise a sum of $5,000,000 and finance home building.

Taking it all together, it plainly means busy times ahead of the sand and gravel people because it is this industrial building which calls for a greater percentage of hard building material. Indications from this are that instead of accumulating reserve piles for the winter, early this fall the local sand plants will be kept pretty busy right through the late summer and fall and will have to do their stock accumulating later.

Some little relief has been found from the coal priority on cars in that cars may be loaded for shipment of sand and gravel direct toward the coal mines. This has helped out considerably in making shipments toward the coal mining territory. Moreover, there is some hope expressed now that with higher rates and higher wages the railroad people will put forth extra effort and clear up the congestion enough to give us real transportation during the fall months.

The State Highway Commission, Frankfort, Ky., is to let some highway contracts August 31. The contracts include some roads in the following counties: Knox, Muhlenberg, Webster and Morgan.

In addition to all the proposed industrial and road work mentioned above, there is announcement, too, that we are to have a great revival of construction in railroad work which should be splendid news for gravel and crushing plants. One specific plan announced for Louisville is the building of a new Big Four bridge across the Ohio river, estimated to cost $7,000,000.

Distributing lime for the soil.

DEVELOPMENT OF FRENCH CHEMICAL INDUSTRIES.

The figures below give some idea of the increase in the productive capacity of France during the war in chemical substances other than fine chemicals. They are quoted from the Board of Trade Journal for April 1, 1920.

Products	1913		1919	
	Production Tons	Consumption Tons	Production Tons	Consumption Tons
Sulphuric acid, 58°	1,160,000	1,172,500	2,500,000	1,500,000
Sulphuric acid, 66°	58,000	58,000	1,200,000	.....
Oleum (fuming sulphuric acid)	6,000	6,000	300,000	25,000
Nitric acid	20,000	18,500	360,000	20,000
Sodium salts	625,500	506,000	800,000	650,000
Liquid chlorine	300	.....	90,000	15,000
Bromine	.....	100	500	200
Calcium carbide	32,000	28,000	200,000	.....
Calcium cyanamide	7,500	8,000	300,000	.....
Ammonium salts	75,000	95,000	200,000	150,000
Nitrate of lime	.....	9,500	250,000	250,000
Natural phosphates	2,700,000	1,220,000	3,000,000	2,700,000
Superphosphates	1,965,000	1,900,000	2,500,000	2,500,000
Phosphorus	300	30	3,600	.....

Great strides, the Journal states, have also been made in the manufacture of synthetic products, an impetus having been given by the requirements of the war.

The great peat beds of the Sturgeon River swamp, which lies partly in Houghton and Baraga counties, in the northern peninsula of Michigan, are to be converted to commercial fertilizer use by the Michigan Humus & Chemical Company, work already being in progress at Klingville, Baraga County.

The Chincoteague Fish, Oil & Guano Company, Chincoteague, Va., has been organized with an authorized capital stock of $750,000, consisting of 7,500 shares, par value $100 each, common stock. The officers are: Henry W. Conant, president; Warren J. Courtney, vice-president; C. F. Matthews, treasurer; S. B. Field, secretary.

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Gravel, Sand and Stone Plants

SCREW AND BELT CONVEYORS.

BUCKET ELEVATORS, with buckets on chain or belt, furnished with or without steel casings.

BUCKETS—standard types in steel or malleable iron, steel buckets of special design made to your specifications.

GEARS—MACHINE MOLDED or with CUT TEETH.

CHILLED RIM SPROCKETS.

CHAIN—standard malleable detachable, Ley bushel, steel or malleable roller.

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CHICAGO

Western Ave., 17th and 18th Sts.

Makes Sand Contract

Grand Haven Closes Deal to Have Accumulations Removed Along River Front

A contract has just been closed by the city officials of Grand Haven with Messrs. Hubbel and Ohlemacher, contractors, operating in Michigan City, Frankfort, Manistee and Ludington, whereby the latter will take at a specified price hundreds of tons of sand from along the river front in that city.

The contract has just been closed and its terms are the most favorable that could possibly be obtained for Grand Haven. Not only is a good price to be secured for the sand which the company will take, but a settlement has been made whereby Grand Haven receives $2,000 for the non-fulfillment during the past two years of the contract entered into by Grand Haven and the Grand Haven Sand Company, an organization which proposed to buy sand from the city and then effected a breach of contract as made with them.

The present contract provides that Messrs. Hubbell and Ohlemacher shall pay to the city $1.50 for the first 2,000 cars of sand taken from the hills near the city water plant, and $1.00 per carload for all sand taken after that. It is estimated that at $1.50 a carload the price will be about three cents a ton, and that $1.00 a car, the price will be about two cents a ton.

The old Pere Marquette tracks on Water Street will be extended by the city so that cars can be backed to the sand hills south and west of the city power plant. This work will be completed with as little delay as possible so that the starting of the hauling of sand may commence. The contract also provides that 1,500 cars of sand at least shall be taken away and that in default the purchasers shall pay for that amount regardless of whether or not they have taken it. The contract extends over a period of five years. Not only will the city receive compensation for sand taken from the city proper but it will also be paid for that taken from other locations. This compensation will be for the privilege of running cars into the city and over the city streets to get at the sand.—Holland, Mich., Sentinel.

Conveyor Problems

A book entitled "Conveyor Problems and Their Solution" is just being sent out by the Main Belting Company of Philadelphia.

Regarding the book, and the service rendered by this company, an officer of the concern says:

"It is our hope and belief that this book will serve a real purpose in aiding to direct the thought of more plant managers to a belt conveyor as one of the most efficient means of transporting material in raw and finished state, and for conserving labor.

"It has been our aim to point out to the user and prospective user wherein it is possible for him to avoid some common, costly features attributable to poor design both in machinery, particularly rollers, and in general arrangement,—and furthermore to show how simple of solution is the problem of installing a belt conveyor which will operate efficiently with the lowest possible maintenance.

"You will understand, of course, that the experience of our engineers is at the disposal of any patron or prospect who may wish to call upon us for suggestions. There is no charge or obligation attaching to this service; we welcome the privilege of rendering such assistance."

Opens Chicago Office

Easton Car & Construction Co., announces the opening of new offices in the Peoples Gas Building, Chicago, to take care of the increasing business in the west and middle west districts.

Truck Company Expands

At a meeting of the directors of the Gramm-Bernstein Motor Truck Company held at the offices of the Company in Lima, Ohio, on July 31st, a stock dividend of 50 per cent was declared out of surplus earnings to the common stockholders of record and it was also voted to increase the capitalization from $1,500,000 to $5,000,000, the entire amount to be issued as common stock.

It is the expressed intention of the principals to also offer a limited amount of stock to the public.

Service and Durability

Are inherent qualities of Link-Belt Machinery. Our equipment is built up to a high standard and not down to a low price, with one idea in mind—to do the work for which it is designed in the most economical and quickest way.

This Link-Belt continuous bucket elevator for handling heavy stone furnishes a practical example of the fitness of Link-Belt equipment for the work it is to perform. It has handled to date over 2,500,000 tons of trap rock and is still going strong.

We build a complete line of bucket elevators of every type and for every service. Our many standard sizes and designs can be adapted to any local conditions.

Let us figure on your requirements. Catalogs on request.

LINK-BELT COMPANY

Philadelphia **Chicago** **Indianapolis**

Offices in Principal Cities

LINK-BELT

Stone Handling Machinery

Now in Operation

Reorganized New York Concern Turning Out Crushed Stone

Geneva, N. Y., Aug. 18.—The newly organized Geneva Stone Corporation has resumed operations at its plant at Oaks Corners and is now turning out 400 tons of broken stone daily. This, it is said, is far from the ultimate output of the plant, as the new giant crusher has a capacity of 1,000 tons in ten hours. In the rebuilding of the plant the latest equipment has been installed and all hand labor has been eliminated. Mechanical facilities are used to handle the stone from the time it leaves the quarry until the broken stone, properly graded, is dumped into cars or trucks for delivery.

The central feature of the new plant is the mighty gyratory crusher into which a carload of rock is dumped and in a moment or two is reduced to crushed stone. The crusher weighs 100 tons, is 90 inches in diameter and crushes rock up to 30 inches in size. A 150-horsepower motor provides the power for the operation.

In getting the rock to the crusher a series of mechanical operations are employed. The virgin rock is shattered by dynamite, and a steam shovel is then employed to pick up the rock and load it in quarry cars. These cars are moved about on a narrow gauge track and are hauled up the incline to the crusher by a cable and an electrically-driven winch. Several motors are employed to operate the various parts of the plant, making a total of 350 horsepower. Another interesting feature of the plant is an electrically-driven well driller. This machine drills the holes for the heavy charges of dynamite that are used in breaking down the rock.

Outside of the stone that is taken for concrete and road work in and about Geneva, the principal field for the product of the company at present is to points south, owing to the fact that railroad restrictions prevent the shipment of materials in coal cars in directions away from the mines. As soon as these restrictions are removed an ample market exists for stone in other directions. The working force at the plant is nearly one hundred men.

Iron Works Purchased

The Worthington Pump and Machinery Corporation, 115 Broadway, New York, sends out the following announcement:

"We desire to announce the purchase from the Platt Iron Works, of Dayton, Ohio, of their drawings, patterns, jigs, templates, special tools, good-will and name, on their following lines of product:

"1. Oil mill machinery, suitable for the extraction of oil from all sorts of nut and seed products, comprising crushers, cookers, cake formers, presses, filters and pumps.

"2. Hydraulic turbine and water wheel line, covering their entire line of hydraulic turbines and water wheels, horizontal and vertical, high and low head.

"3. Feed water heaters, steel and cast iron, horizontal and vertical.

"4. High pressure air compressors for torpedo and other high pressure charging, cleaning and discharging."

Recent Patents

The following patents of interest to readers of this journal recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c each. State number of patent and name of inventor when ordering.

1,346,871. Crusher. Herman P. Andresen, Chicago, Ill.

1,346,966. Coal-mining machine. Seward N. Mighell, Chicago, Ill.

1,346,999. Excavating-bucket. William M. Venable, Pittsburgh, Pa., assignor to Blaw-Knok Co.

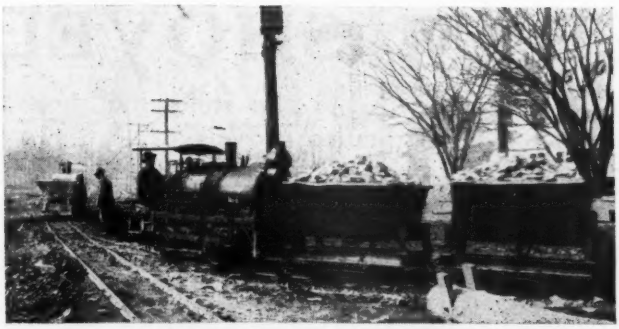
1,347,000. Apparatus and art for handling coal and the like. Edwin C. Washburn, Englewood, N. J.

1,347,717. Hammer-mounting for pulverizers and the like. Harry J. Shelton, St. Louis, Mo.

1,347,58. Cableway. Harry DeC. Richards, San Francisco, Cal.

1,347,763. Aerial ropeway. Herbert F. H. Shields, Welling, and John P. Roe, London, England, assignors to Ropeways Limited, London, England.

1,348,599. Reclaiming and conveying apparatus. Francis L. Stuart, Washington, D. C., assignor to International Conveyor Corporation, New York, N. Y.



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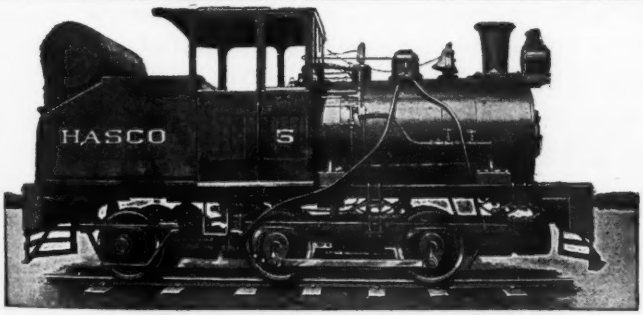

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Style Shown at Top of This Ad—3 to 15 Tons Capacity.

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Special attention is called to the following thoroughly overhauled shovels.

1—Model 0 Thew, shop number 1084.
2—Marion 60 Steam Shovels with 2½ yard dipper, Shop Nos. 1995 and 2059.

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8—18 ton, 10x16″ Porter Dinkeys, 36″ gauge.
2—12 ton, 9x14″ Porter Dinkeys, 36″ gauge.

CARS

30—12 yard capacity Western, standard gauge air dump cars, 26′ beds.
40—4-yard Western 36″ gauge steel beam.

In addition to the above, we have a large stock of contractors' construction equipment of various classes.

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Two—50-ton six-wheel switch engines, cylinders 18″x24″, wheel base 11 feet, wheel centers 44″, steam pressure 150 lbs. tractive force 20,800 lbs.

One—60-ton six-wheel switch engine, cylinders 19″x24″, wheel base 11′-6″, wheel centers 44″ butt strap boiler, steam pressure 160 lbs., tractive force 23,100 lbs.

One—75-ton Consolidation locomotive, cylinders 20″x26″, wheel centers 44″, butt strap boiler, tractive force 36,300 lbs.

These locomotives are now being overhauled at our shops and delivery can be made in ten days. Will furnish detailed description upon application. Shipping point, Covington, Ky.

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1—No. 6 Kennedy gyratory
1—No. 5 Kennedy gyratory
1—No. 4 Austin gyratory
2—No. 3 McCully gyratory
1—No. 2 Austin gyratory
1—60x84 Superior jaw.
1—30x60 Traylor jaw
1—15x24 P. & M. jaw
1—13x30 Farrell jaw
1—10x20 Farrell jaw
1—11x20 Acme jaw
1—12x22 Acme jaw
2—9x16 Climax jaw
1—9x16 Reliance jaw
1—9x15 Cedar Rapids jaw
1—7x12 Reliance jaw

SCREENS—Assorted Sizing, Scalping and for sand.
ELEVATORS—Assorted lengths, capacity 25 to 250 tons per hour.

Steam Shovels

1—Erie, type "B," ¾ yd. dipper, traction, full revolving.
1—Model 28 Marion, ¾ yd. dipper, 30' crane boom for clam shell bucket operation, traction, full revolving.
1—Bucyrus, 17-B, ⅞ yd. dipper, new 1916, shop No. 1934, used little, with Massachusetts standard boiler, traction trucks, full revolving.
1—Marion, Model 20, Shop No. 922, 1 cu. yd. dipper on standard gauge railway trucks.
1—Marion, Model 40, Shop No. 1865, 1½ cu. yd. dipper on standard gauge railway trucks.
1—Bucyrus, 70-C, Shop No. 1685, 2½ cu. yd. dipper on standard gauge railway trucks.
1—Boom for Model 60 Marion, 35' long, 24' dipper stick and 1¾ yd. dipper, slightly used.
1—Dipper, 1¼ cu. yd. for Thew Shovel.

Locomotives

1—Plymouth, 3-ton, gasoline, 24" gauge.
1—Baldwin, consolidation, type 2-8-0, 8 drivers 44" centers, 20"x24" cyls., 107,000 lbs. on drivers; 8 wheel tender; 9½" air pump; tractive force 22,000 lbs. Now working, will be released shortly from lease.
1—Pittsburgh, Saddle tank, 4-38" drivers, 14"x24" cyls., steam brakes, standard gauge.
3—Porter, Saddle tank, 4 wheel; 9"x14" cyls., 36" gauge.
1—Vulcan, Saddle tank, 4 wheel; 9"x14" cyls., 36" gauge.
2—Plymouth, 4 wheels, friction drive, 3 ton, 4 cyl. gasoline engines, 36" gauge.

Hoists

1—12½x15 Stroudsburg, double cylinder, double drum, built for dragline service, used one month.
1—90 H. P. Thomas, electric, double drum dragline hoist, two speeds on forward drum, used six months.
1—112 H. P. Vulcan, electric, double drum mine or haulage hoist.
1—200 H. P. Davis, steam, cone drum, mine hoist.

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1—1 yd. Orange Peel.....$ 300
1—1-yd. Dragline, Page..... 300
2—1-yd. Concrete at $50 each..... 100
1—1½-yd. McMyler (new)..... 500
3—2-yd. Brown Hoist at $500 each. 1,500

BOILERS

1—200 H.P. Scotch Marine 2,000
1— 30 H.P. Upright 200
1— 15 H.P. Upright 100
1— 60 H.P. Upright 800
1— 50 H.P. Upright 700
2— 60 H.P. Erie Economic at $750 each 1,500

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1—No. 12 Gates Style K manganese fitted nickel steel shaft (almost new) 8,000
1—No. 7½ Austin Gyratory..... 2,500
2—20x24 Blake, each..... 2,000
1—No. 4 Gates Gyratory..... 1,000
1—10x20 Blake 750

COMPRESSORS

1—Rand Imperial Duplex, cap. 1,500 ft. 2,000
1—Ingersoll, 2-stage, air, belt drive, 600 ft. 1,000

DIPPER

1—2½-yd. Bucyrus 500
1—¾-yd. Browning with boom and engine (new) 750

DRILLS

8—Chicago Pneumatic Tool Co. 3¼ in. drills, each..... 100

DERRICKS

1—5-ton Stiff Leg with steel bull wheel 500
1—2-ton Stiff Leg..... 200

ENGINES

1—150 H.P. Atlas Automatic.....$ 750
1—200 H.P. Allis-Chalmers Corliss. 1,250
1— 20 H.P. Erie Center Crank..... 200
1— 70 H.P. Erie Center Crank..... 300
1— 15 H.P. Keystone Reversible... 250
1—Westinghouse 250
1—150 H.P. Stillwell Bierce..... 150

HOISTING ENGINES

2—6¼x10 American Hoist and Derrick with boiler at $750 each.... 1,500
2—6x8 Contractors' Plant Co. S. C. S. D., at $200 each..... 400
1—8x12 Lidgerwood D. C. D. D.... 500
1—12x14 Special Dragline, 90 H.P. (new) 1,500
1—9x10 D. C., 3-drum Cableway Engine 1,500

LOCOMOTIVES

1—Vulcan 36-in. gauge Saddle Tank 1,000
1—Porter Standard Gauge Saddle Tank, 14 tons..... 2,000

PUMPS

1—No. 5 Pulsometer..... 100
1—Wilson-Snyder Water Works, 3,000,000 gals. per day..... 1,500

ROLLERS

1—10-ton Steam Roller..... 1,000

SCREENS

1—42-in. by 14-ft. Screen complete.. 400
2—Stephens & Adamson at $150 each 300

SHOVELS

1—Model 28 Marion Traction, fine.. 4,700
1—Vulcan-Bucyrus Revolving Shovel, standard gauge, perfect..... 3,250
1—70 C. Bucyrus with standard, also stripping booms and dippers.....11,000

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30 H. P. Burke Motor, 220 volt, 750 RPM, 25 cycle, 3 phase induction motor with starter and base and pulley.

100 H. P. Burke Motor, 200 or 440 volt, 750 RPM, 25 cycle, 3 phase, slip ring induction motor with starter, base, and pulley.

Both motors run less than a year and in perfect condition.

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313 Commerce Bldg., Erie, Pa.

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250 tons of 50-lb. rail complete with angle bars, in excellent condition. Immediate shipment.

Industrial Service Company
Lincoln, New Jersey

STEAM SHOVELS

1—Model 18 Osgood Steam Shovel, on traction wheels, with ¾-yd. dipper, butt strapped boiler.
1—No. 0 Thew Steam Shovel, on traction wheels, with ¾-yd. dipper, combination boom, can be changed to shipper shaft, butt strapped boiler.
1—Marion Model 28 Steam Shovel, on traction wheels, with ⅝-yd. dipper, butt strapped boiler.
1—Model 3 Keystone Shovel, with extra clam shell bucket and extension boom.

LOCOMOTIVE CRANES

1—15-ton O. & S. 4-wheel Locomotive Crane, butt strapped boiler, 35-ft. steel latticed boom, with clam shell bucket. New in 1917.

Midwestern Company
140 South Dearborn Street
Telephone State 8356
CHICAGO

EQUIPMENT—IMMEDIATE DELIVERY

1—Model "28" Marion traction shovel, thoroughly overhauled.
1—Type "B" Erie revolving shovel, ¾-yd. dipper, 12-ft. dipper stick.
1—Type "O" Thew traction shovel, built in 1916, ¾-yd. dipper—very good condition.
1—Vulcan Little Giant traction shovel, 1¼-yd. dipper—good condition.
1—Class "14" Bucyrus dragline, 60-ft. boom, 2-yd. bucket—first-class condition.
16—12-yard Western, standard gauge air brake and air dump cars, overhauled.
1—Western, standard gauge spreader car.
1—15-ton O & S 8-wheel locomotive crane, 50-ft. boom, ¾-yd. orange peel bucket, new last fall.

Particulars furnished on other equipment. Send us your inquiries.

THOS. J. DOLAN
76 W. Monroe St., Chicago, Ill.

FOR SALE

1—No. 10, 2-stage Alburger centrifugal pump on sub-base. Can be either arranged for belt drive or direct connection.
1—No. 10 Morris centrifugal pump, arranged for belt drive.
1—5x6 Deane vertical triplex pump.
1—10x14 Carterville jaw crusher.

All items in stock and condition guaranteed.

Machinery Warehouse Co., Inc.
1455 West 38th St., Chicago, Ill.

FOR SALE

To settle estate—Trap Rock Quarry located Bridgeport, Ct., three miles from center, in busy city, on Berkshire Division of N. Y., N. H. & H. R. R. Also good road for auto delivery. First class condition and could be started at once.

THE IRON LEDGE CO.,
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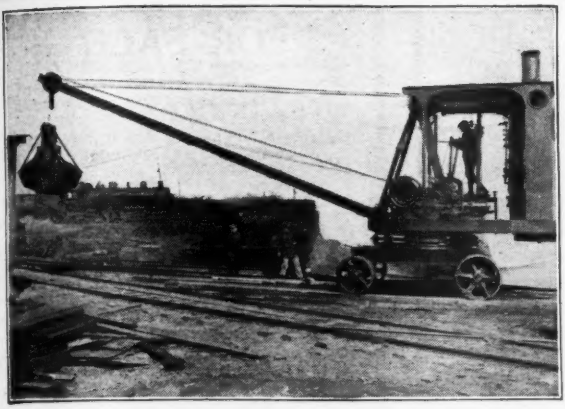
13 end-dump cars, good condition, wooden, steel lined, capacity 25½ cu. ft., 30-in. gauge, 16-in. Whitney Roller Bearing Wheels, built by Sanford-Day Co.

RAMPUS STONE CO.,
Mascot, Tenn.

LOOK THESE OVER

Road rollers—6 and 10 ton.
No. 4 Gates Crusher with elevator and screen.
R. R. Crane, 38-ft. boom, ½ revolving, 1-yd. bucket, all steel, almost new, $4,000.00.
Hoisting Engines, portable boilers.
Thew O. Shovel, Marion, 2½-yd. R. R. shovel.
20-ton Saddle Tank Locomotive, dump cars.

SEYMOUR ENGINEERING COMPANY
115 S. Dearborn St. Chicago



Full-Revolving Self-Propelling

Locomotive Cranes

Mounted on Traction Road Wheels. Equipped with 30-ft. Booms and ¾-yard Clamshell Buckets.

All Brand New

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CONTRACTORS' EQUIPMENT OF ALL KINDS

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3" Centrifugal Pump belted to 4 H.P. Novo Gasoline Engine.
6—6x5" Humphrey Hand Pumps.

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10x10x10" Ingersoll.
12x12x12" Platt.
14x14x14" Chicago Pneumatic.

BELTED COMPRESSORS

10x12" Sullivan.
12x14" Chicago Pneumatic.
14x12" Sullivan.

HOISTING ENGINES

6¼x8" Lidgerwood Single Drum.
7x10" Flory Single Drum.

BOILERS

30 H.P. Vertical.
40 H.P. Vertical.
50 H.P. Vertical.

Send for our complete list.

Wickes Machinery Company
JERSEY CITY, N. J.

FOR SALE

Locomotives and cars, both standard and narrow gauge, also steam shovels which have been rebuilt at our plant and ready for service. Have large stock to select from.

Southern Iron & Equipment Co.
Est. 1899 Inc. 1906

Branch Offices: New Orleans, La.

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1—Lakewood Clam Bucket, No. 640, with teeth, 1 yd. capacity, weight 4,300 lbs.

140—Elevator Buckets, 14"x7", 10 gauge.

1—Guy Derrick—no blocks nor cables.

1—Cylinder Screens (new) 36" diameter x 72" long x ⅜" thick, round perforated holes 1⅜".

1—Cylinder Screen (new) 36" diameter x 72" long x ⅜" thick, round perforated holes 1".

1—Cylinder Screen (slightly worn) 36" diameter x 72" long x ⅜" thick, round perforated holes 2½".

1—Cylinder Screen (slightly worn) 36" diameter x 72" long x ⅜" thick, round perforated holes 3".

1—80 ton Victor Steam Shovel,—2½ yd. dipper.

1—7½ ton standard gauge steam locomotive, Davenport.

1—36" Symons Horizontal Disc Crusher.

1—Length Goodyear Rubber Conveyor Belt 56' 6", width 36", 6 ply, extra heavy rubber wearing surface. This belt has never been in use.

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Toledo, Ohio

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CARS

9—12-yd. Western air dump cars, standard gauge, cheap.
40—6-yd. standard gauge, Western.
62—4-yd. steel under frame, 36-in. gauge.
Others 1½ to 20 pounds.

STEAM SHOVELS

1—70 C Bucyrus, 2½-yd., standard Gauge.
1—Type O Thew, traction wheels.
1—18 Osgood, traction wheels.

LOCOMOTIVES

1—35-ton Porter standard gauge saddle tank.
2—30-ton Mogul type, 36-in. gauge.
1—40-ton Vulcan Saddle Tank, standard gauge.
2—40-ton, 4-wheel, standard gauge switchers.
Others 7 to 75 tons.

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New York City, N. Y.

FOR SALE, OR WILL RENT TO RESPONSIBLE PARTY

Byers Auto Crane, late model, ¾-yd. clam shell (Cleveland, O.)
2—Thew ⅝-yd. Steam Shovels (Poughkeepsie, N. Y.), and central Indiana.
20,000 ft. 24-in. gauge Koppel 20-lb. portable track.
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Austin Paver, 2-bag, caterpillar, steam traction (Detroit).
Austin and Case rollers, both 3 wheel; also scarifier.
Bucyrus Railroad Shovel, 65-ton, 2½-yd. dipper (Milwaukee).
35-ton standard gauge locomotive, four drivers.
D. B. STRALEY, Crown Point, Ind.

GYRATORY CRUSHER

McCulley No. 5 Crusher; hourly capacity, about 40 tons; center drive.

HOLLOW DRILL STEEL

150 sections of round, hollow steel bits, from 6 ft. to 22 ft. long, 1½-in. diameter.

LOCOMOTIVES

9x14, 36-in. gauge, Porter, 12-ton. 10x16, 36-in. gauge, Porter, 18-ton.

GENERAL EQUIPMENT CO., Gridley Bldg., Syracuse, N. Y.

A. C. AND D. C. MOTORS AND GENERATORS—NEW AND USED—NEW GENERAL ELECTRIC SLIP RING MOTORS—CHICAGO STOCK

2—150 HP, 440 v., 600 RPM Motors. 1— 15 HP, 220 v., 1200 RPM Motor.
1— 50 HP, 220 v., 900 RPM Motor. 1—7½ HP, 220 v., 1200 RPM Motor.
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2—50 HP, 125 v., Western Elec. direct current generators, dir conn. to Erie Ball engines.
1—75 HP, 220 v., General Electric, 900 RPM, type ITC, crane type, 3 phase, 60 cycle motor, complete.
1—100 KVA, 2300 v., 900 RPM, Western Electric, 3 phase, 60 cycle, alternator, complete.
1—150 KVA, 2300 v., 600 RPM, Fort Wayne, 3 phase, 60 cycle alternator, complete.
1—175 KVA, 440 v., Allis-Chalmers, 3 phase, 60 cycle alternator, complete. USED THREE MONTHS.

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(Formerly Chicago Elec. Const. Co.)
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For Immediate Delivery—Overhauled and Guaranteed—Largest Stock in America to Choose From. For Sale: 3 Phase, 60 Cycle, 220 V.

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1—	3—General Electric	1800
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2—	15— " Type CCL	1750
2—	15—Watson, slip-ring, var. speed	1720
1—	15—Fairbanks-Morse	1200
1—	15—General Electric, Form L	1200
1—	15—General Electric	1200
3—	15—Fairbanks-Morse, slip-ring, constant speed	1200
1—	15—Westinghouse, vert.	1135
2—	15—Allis-Chalmers	1130
2—	15—Allis-Chalmers	860
2—	15—Westinghouse	850
4—	20—Westinghouse	1750
1—	20—General Electric	1200

Send for MONTHLY BARGAIN SHEET, showing complete stock and net prices.

GREGORY ELECTRIC CO. CHICAGO, ILLINOIS

LOCOMOTIVE CRANES

35-ton McMyler.
15-ton, 8-wheel Brown Hoist.
5-ton Industrial.

LOCOMOTIVES (36" Gauge)

4—Porters, 9x14, Saddle Tank.
4—Porters, 11x16, Saddle Tank.
2—Vulcans, 10x16, Saddle Tank.
2—4-ton Bell Oil, 24-in. Gauge.

LOCOMOTIVES (Standard Gauge)

1—35-ton Saddle Tank.

BUCKETS

1—2-yard Brown Hoist Clamshell.

CARS

1—Passenger Car, Standard Gauge.
1—Box Car, Standard Gauge.

HOISTS

1—8¼x10 Kendall D.C. D.D. Boiler.

FLAT CARS

80—Standard Gauge, 50,000-lb. cap., with stake pockets.

DERRICKS

10 to 30 tons.

HOISTING MACHINERY CO.,
Hudson Terminal Building
New York

HANNA'S
Guaranteed
EQUIPMENT

Ready for immediate delivery

CRUSHERS

1—No. 7½ Austin, regular drive.
1—No. 6 style D Gates L. H. Angle drive.
1—No. 6 Austin, rear drive.
1—No. 4 Austin, rear drive.

SHOVELS

1—Marion Model 60, 2-yd. dipper.
1—No. 0 Thew, N. Y. State, $4,300.

SAND PUMPS

1—12-in. Morris Sand pump, direct to pair of 9x9 engines.
4—No. 4 Nye Sand Pumps.
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1—5-ft.x22-ft. Allis Chalmers tube mill complete.
1—No. 1 Sturdevant fine grinding crusher.

THE H. H. HANNA CORPORATION
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Electric Hoist Motors

2—75-HP. G. E., D. C., hoist motors, complete with resistance and drum controllers, 230 volts.

Centrifugal Pumps

1—Dayton centrifugal pump, 5" suction, and 4" discharge, complete with accessories.

1—Worthington centrifugal pump, 6" suction and 8" discharge, complete with accessories.

2—4" Morris Machine Works electric centrifugal sand pumps, with or without motors.

1—12" Morris Machine Works electric centrifugal sand pump with or without motor.

For quick sale, very cheap.

2000 Other Bargains in Motors

NATHAN KLEIN & CO.
Baxter, Centre and Howard Sts.
NEW YORK CITY

Marion Model 61 Railroad Shovel

Standard 70-ton, 2½ yd. dipper, used but little, practically new. Will pass any inspection. Located New York State. Immediately available.

Also revolving shovels of all kinds.

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FOR SALE

1—Model 28 Marion full revolving steam shovel with ¾-yard dipper, Shop No. 2774. A-1 condition, $5,000.00 f. o. b. cars Medina, Ohio.

THE DAY & MADDOCK CO.
Winslow Avenue, N. W., and B. & O. R. R.
Cleveland, Ohio

QUARRY EQUIPMENT

6—36 in. ga. **Vulcan** and **American Dinkeys**, 7 to 20 tons.
5,000 feet 20-lb. 24-in. ga. **Portable Track.**
1—**Bucyrus** 18-B Traction Steam Shovel.
Standard gauge 59-ton **SHAY GEARED**, three truck locomotive.
24—Standard gauge 30 ton **Logging Cars.**
450 tons 65-lb. **Relay Rails.**
550 tons 70-lb. **Relay Rails.**
Logging Equipment **Machine Shop**

Send us your inquiries

E. C. SHERWOOD
50 Church Street, New York

FOR SALE

Thew Type O. Shop No. 1163, ¾-yd. Grading Dipper, ½-yd. sewer dipper, combination boom, in excellent condition, Minneapolis location.

2—Marion, Model 28—one with caterpillar. Both thoroughly overhauled and in A1 condition.

3—Marion, R. R. type shovels. Models 40, 41 and 60.

Four Drag Lines, 1, 1½, 2, and 3-yd. Page Bucket Capacities.

American Clay Machinery Company Rotary Dryer, 48"x60 ft. complete, used three years.

Crushers, Screens, Dry Pans, Clam Shells, Orange Peals and Rail 20 lb. to 60 lb.

Industrial Engineering Company
354 Plymouth Bldg., Minneapolis, Minn.

FOR SALE

1—Type "B" Erie Traction Shovel.
1—14-B Bucyrus Traction Shovel.
1—Model 31 Marion Traction Shovel.
1—No. 0 Thew Traction Shovel.
Everything for the Contractor. New and Used.
Send us your inquiries.

W. E. KENNEDY CO.,
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LEATHER RUBBER **BELTING** STITCHED CANVAS

An Enormous Stock of New and Used Power Transmission Machinery, Belting, etc.

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Send for No. 180 Bargain Book.

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Bucyrus ½-yd. steam shovel on traction wheels, 24-ft. boom, overhauled, immediate shipment, cash, terms, $3,500. Especially adapted for quarry or pit work.

DANIEL B. STRALEY
Crown Point, Indiana

FOR SALE
STEAM SHOVEL

Type "O" THEW Steam Shovel, ¾-yd. Dipper, full revolving, crowding motion, mounted on standard rail wheels. First-class condition. Immediate shipment.

THE MILROSE COMPANY
140 S. Dearborn St., Chicago, Illinois

FOR SALE

Marion 35 R. R. 1½-yard shovel.
Tender (Loco) 8-wheel, 5,000 gal.
Flat cars, 36-in. gauge, 4 wheel, 42x72 deck, all steel.
Switcher, 40-ton, 4 wheel, S. G., 17x24.
Gondolas, 50-50 ton, all steel.
1 each, 5 McCully and Gates crushers.
Crane, 15-ton, McMyler, 4 wheel bucket handling.
Clams, 2 2-yard Owen, 1 1-yard Keisler.
A. V. KONSBERG, 40 N. Dearborn St., Chicago

For a list of unusually good bargains in
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Hoists, Engines, Crushers, Boilers, Wire Rope, Rock Drills, etc.
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AIR COMPRESSORS

Steam and belted, 100 lb. working pressures, 250 to 2500 ft.

BOILERS

Tubular and Vertical, all sizes, 10 to 150 hp.

ENGINES

Corliss, Plain and Vertical. All sizes, special bargains on Corliss stock.

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Steam and Electric.

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FOR SALE
DERRICK

Stiff Leg—3 Line—38-ft. Mast—
58-ft. Boom—Steel Bullwheel

Phone or wire

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16 CABLEWAY EQUIPMENTS

12—7x10 double drum Stroudsburg engines, fitted with link motion. Drums 24 in. x 24 in., with rear one having concave ends for transversing line.
10—Oregon Pine Masts, 72 ft. to 92 ft. long. Average dial 17 in.
50,000 ft. ⅝ in., 6 x 19 C. S. Wire Cable.
15,000 ft. 1⅛ in. 6 x 19 C. S. Hauling Wire Cable.
50,000 ft. 1¼ in. 6 x 19 Cableway Wire Cable.
And all the Clips, Guys, Blocks, Shackles, Sheaves, Frames, etc., from the above plant. All this equipment is practically new and ready for immediate delivery. Inspection is welcomed.
4—Manning Vertical Boilers, 500 H. P., will insure for 175 lbs. Immediate delivery.

NEW BAR IRON

25 tons 1 in. x ⅝ 5 to 6 ft. long.
10 tons 1⅜ x 1 in. x 5 to 6 ft. long.
10 tons 1¾ in. x ¾ in., full lengths.
5 tons 1¾ in. x ⅝ in., full lengths.
Grout Boxes, Tanks, Rails, Second-hand Pipe.

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FOR SALE

25 Gyratory Crushers, 20 Jaw Crushers, from No. 2 to No. 21, from 6x10 to 60x84.

50 Pulverizers, every type, Coal Crushers, Ore Washers, Channelling Machines, Grinders, all types Screens, Locomotives, Cars, Rails, Steam Shovels, Dragline Machines, Dredges, Corliss Engines, Water Tube and Return Tubular Boilers, Turbo Generators, Direct Connected and Belted, also Fuel Oil Direct Connected Sets, Heavy Fuel Oil Engines, Electric Fuel Oil Locomotives, Compressors, Drills, Cutting and Channeling Machines, Stone Derricks, Electric and Steam Hoists.

J. F. DONAHOO CO., Birmingham, Ala.

FOR SALE
Slightly Used Oil Engines

25 HP. Fairbanks-Morse.
40 HP. Fairbanks-Morse.
50 HP. Otto.
60 HP. Fairbanks-Morse.

A. H. McDONALD
548 W. Monroe St., Chicago, Ill.

VULCAN LOCOMOTIVE

11x16, standard gauge, saddle tank, shop No. 1087, good condition; immediate shipment.

MOORE BROS.,
39 So. La Salle St., Chicago, Ill.

FOR SALE

One 500-gallon Portable Tar Kettle in good order. Price, $200.00.

HENRY TURNER
P. O. B. Poplar Bluff, Mo.

Mogul locomotive, 36-in. gauge, 20-ton Sturdevant balance roll, 20x14. Reliance jaw crusher, 9x16. Gates No. 2 with elevator. 15,000 ft. 24-in. gauge Koppel track, 20 lb. Keystone Excavator, with scoops. Immediate shipment, cash, terms or will rent.

Lock Box 205, Crown Point, Indiana.

WANTED—DRILL

A No. 14 Cyclone, gasoline traction, or Clipper of similar type.

BOX 90

PIT & QUARRY
538 S. Clark St., Chicago.

WANTED

Thew No. 1, 2 or 3 revolving shovels on railway trucks.
No. 6 gyratory crusher.
7x10 double drum hoist, with boiler.
12 standard gauge, 6-yard dump cars.

J. H. CLARK
810 Great Northern Bldg., Chicago, Ill.

FOR SALE OR RENT

Owned by Us and Sold Under Absolute Guarantee

DUMP CARS

35—12-yd. standard ga. Western Air Dump Cars, guaranteed new and unused; 60,000 lb. capacity trucks; latest type with vertical air dump cylinders, steel underframes and most improved safety appliances; box girder doors.
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31—4-yd. 36 in. gauge Western heavy duty side dump cars, with steel draw sills and box girder doors.
9—5-yd. 36 in. ga. Western heavy duty steel undeframe cars with box girder doors.
18—8-yd. 36 in. gauge double truck Western Air Dump Cars with steel underframes and box girder doors.
2—16-yd. standard ga. Western Air Dump Cars; latest type, with box girder doors and steel underframes.
9—4-yd. 36-in. gauge Continental Side Dump Cars.
2—Western 36-in. gauge Spreader Cars.

STEAM SHOVELS

4—70-C Bucyrus, Shop Nos. 1160, 1331, 1371, 1712, 2½-yd. dippers.
3—Model 60 Marion Steam Shovels, shop numbers 1776, 1899 and 2400. 2½ yd. dippers with full manganese face; butt strap boilers. Shovels complete with tools and work rail sections.
1—65-ton Bucyrus, Shop No. 349, 2½-yd. dipper.

DRAGLINE EXCAVATORS

Model 260 Marion All Steel Dragline; 115 ft. boom, 4 yd. Page bucket. Mounted on 4 self-propelling four-wheeled trucks. Shop number 3026. Electric lighting outfit. Special Ohio boiler carrying 150 lb. steam pressure. Shipping weight 235,000 lb.
1—Class 14 Bucyrus All Steel Dragline; Shop number 720; 60 ft. boom; 2 yd. Page bucket; mounted on skids and rollers.
1—Class B Lidgerwood all steel dragline; Shop number 164; 60 ft. boom; 1½ yd. Page bucket; mounted on skids and rollers.

LOCOMOTIVES

1—Standard gauge, 10 x 16 Cylinder Porter, 4-wheels, saddle tank Locomotive; air brakes, automatic couplers; weight 19 tons.
1—Standard gauge, 13 x 18, cylinder American saddle tank Locomotive; air brakes, automatic couplers, side entrance cars, with rear fuel bunker, steam pressure 165 lbs.; weight 30 tons; built new 1911.
4—36 in. ga. 10 x 16 cylinder Porter, 18-ton saddle tank Locomotive; Shop numbers 4615, 4616, 4661, 5235; extended saddle tanks, wide fire boxes, steam brakes and modern equipment.
4—36 in. ga. 11 x 16 cylinder Vulcan 21 ton saddle tank Locomotives; Shop numbers 1865, 1866, 1867, 1923; butt strap boilers, air brake equipment.
5—36-in. gauge, 10 x 16 Davenport, American and Vulcan saddle tank Locomotives.

BOILERS, MIXERS, DERRICKS, COMPRESSORS, ETC.

2—Milwaukee (16 cu. ft.) Mixers.
3—1-yd. Concrete Buckets.
6—24-in. gauge 1-yd. Koppel Cars.
1—20 x 22¼ x 15¼ x 21 AA-2 Ingersoll-Rand Compressor; 1600-ft. capacity.
1—Brownell, 72-in. x 18-ft. horizontal Tubular Boiler, with 4-in. tubes.
1—30 x 6 Vertical Air Receiver, complete.
1—16 x 16 x 18-in. Laidlaw-Dunn-Gordon Air Comp., with reservoir; weight 15,000 lbs.

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12 and 14 South Canal St., Chicago

T. H. LETSON CO.

Good Used Equipment — Hudson Terminal Bldg. NEW YORK — Clean Business Methods

HOISTING MACHINERY

HOISTS

1—6¼x8, d.c., d.d. Lidgerwood, with boiler.
1—10½x12, d.c., d.d. & swinger skeleton Lambert.
1—9x10, d.c., d.d. & swinger skeleton Lidgerwood.

COMPRESSORS

1—950 cu. ft. Ingersoll Sargent straight line, simple steam, two-stage air, with intercooler.
2—1,300 cu. ft. Ingersoll Sargent, belted to 200 H.P. 3-phase, 60-cycle, 2,200 volt motors.
1—2,400 cu. ft. Ingersoll-Rand, two-stage, air, cross-compound, with Corliss valves.

CRUSHERS

5—No. 5 style "K" Gates Gyratory.
1—No. 6 style "K" Gates Gyratory.
1—60"x84" Power & Mining "Superior" Jaw.

LOCOMOTIVES

Standard Gauge

1—13x18, 6-wheel, Baldwin Saddle Tank.
5—13x18, 4-wheel, American Saddle Tank.
5—14x22, 4-wheel, American Saddle Tank.

IMMEDIATE DELIVERY

150 H. P. 128 lbs. **Marine Boiler** with stack.
4 No. 6 Gates (Mang. Fit.) nickel steel shafts.
1 No. 7½ and 1 No. 8 GATES, Reg. drive.
No. 4 Telsmith plant, A. C. motor drive.
Air compressors (Steam, Belt), 50 to 4,000 ft.
10 Boilers, 60 to 150 H. P., 100 to 130 lbs.
1 30-60 Emerson-Brantingham tractor.
1 18-ton Gallon loader and bin.
4 NEW No. 4 GATES, Mang. Fitted.
7 and 10 and 12-ton gasoline locomotives, 36" gauge.
10 coils Roebling ⅝ in. traction cable (used).
3 Bag Koehring paver, prac. new.
1½-yard Nagley slackline bucket equip.
900 ft. 1⅜-inch NEW Roebling steel cable.
Type "O" ¾-yard Thew steam shovel.
50, 25, 20, 15 and 125 Eng. and turbo *sets*.
Send us your inquiries.

ROSS POWER EQUIP. CO.
Indianapolis, Ind.

FOR SALE

CLAMSHELL RIG

BYERS AUTO CRANE—Steam Traction—Model "C," equipped with ¾-yd. clamshell bucket. First-class condition. Can ship immediately.

THE MILROSE COMPANY
140 S. Dearborn St., Chicago, Illinois

QUARRY BARGAINS

1—No. 4 Gates, including 70 hp. engine, conveyor screens, buckets, 70-ft. guy derrick, bull wheel, 6 guys, 4-in. and 10-in. centrifugal pumps, 20 hp. Mundy D. C. D. D. hoisting engine. $3,000.00 f. o. b. cars.

1—24x13 and 1—36x18 Farrell Crusher, elevator screens, 2—100 hp. Boilers and Engines, etc.

1—Champion No. 15, with 30-ft. elevator buckets and 30 in. x 16 in. screen and dust jacket, 30 hp. Foos gas engine. $1,900.00, f. o. b. cars.

1—No. 3 Gates and 1—No. 6 Allis-Chalmers Crushers, elevator, screens, 150 hp. Ball Steam Engine.

Complete line of Locomotives, Shovels, Cars, Graders, and general line of quarry and contractors' equipment.

FRANCIS E. B. O'BRIEN
Phone Spruce 2262
41 South Fifteenth Street, PHILADELPHIA, PA.

Crushing Screen Wanted

40" in diameter and 18' long; must be in good condition.

L. L. BITTINGER
Hanover, Pa.

WANTED

To buy half or part interest with management of a stone crushing plant, well equipped, 800 to 1,000 tons per day, limestone, trap rock or sand and gravel plant. Address Box 74, PIT & QUARRY, 538 South Clark St., Chicago, Ill.

Standard Gauge Locomotives

1—40-ton, 17x24 in., four-wheel switcher.
1—50-ton, 18x24 in., six-wheel switcher.
2—18-ton, 10x16 in., 36-in. gauge Vulcans.
2—10-ton, 7x12 in., 36-in. gauge Vulcans.
1—10-ton, 36-in. gauge Shay geared.

Miscellaneous

1—Marion 76 steam shovel, No. 3503.
1—Monighan dragline, 120-ft. boom, 3½-yd. bucket.
1—Bucyrus dragline, 60-ft. boom, 2-yd. bucket.
40—60,000-lb. capacity flat cars.
14—1½-yd. V. steel dump cars, 36-in. gauge.
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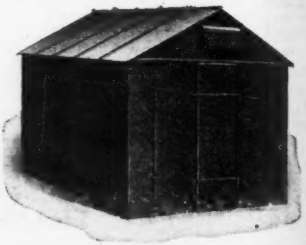

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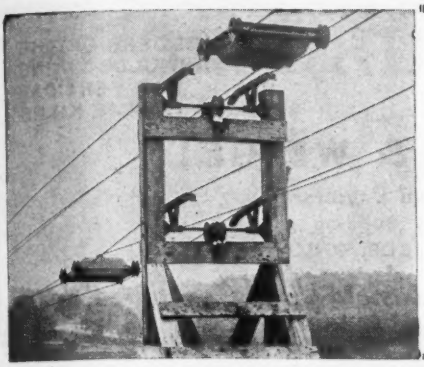

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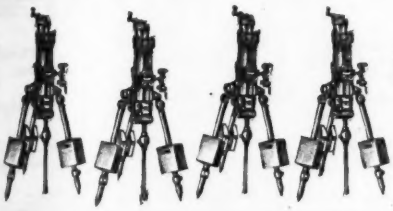

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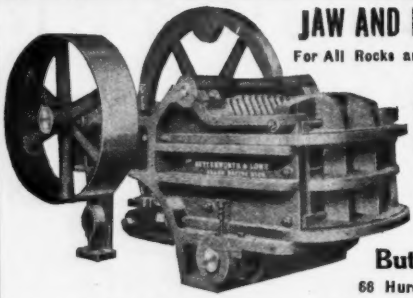

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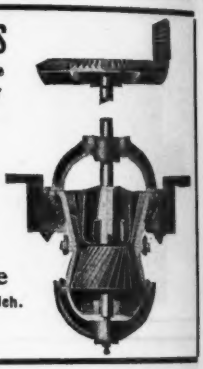

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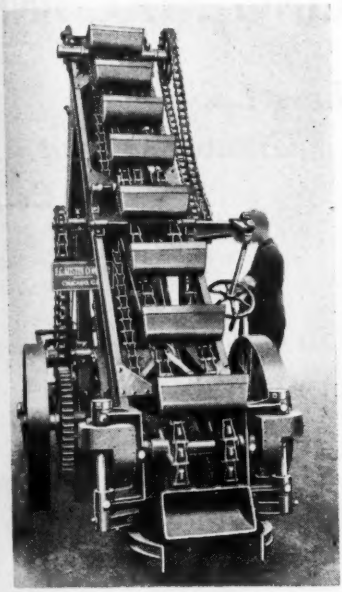

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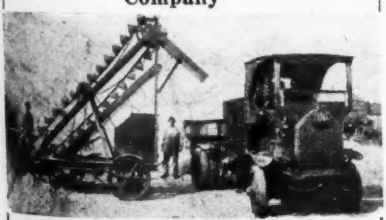

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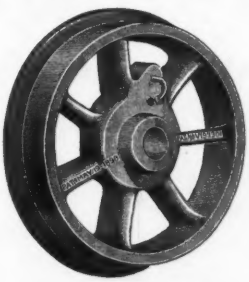

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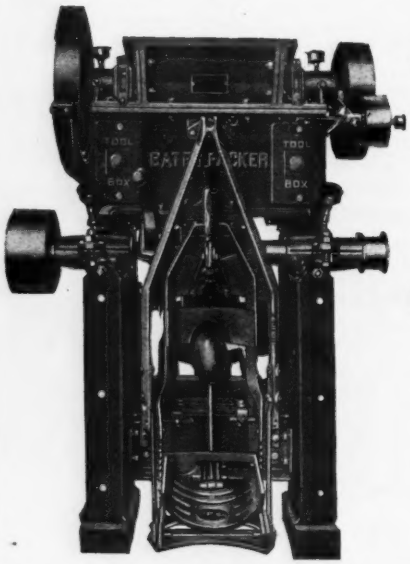

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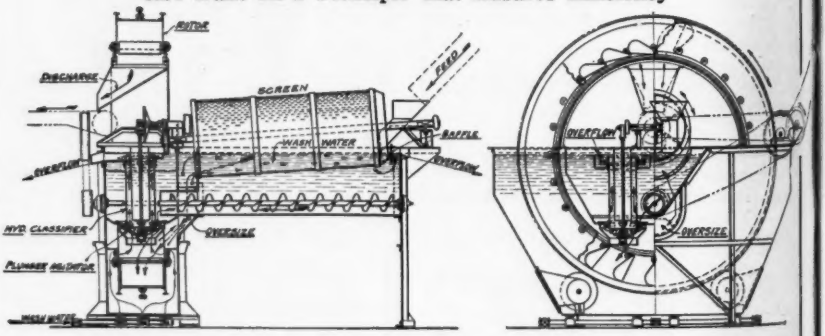

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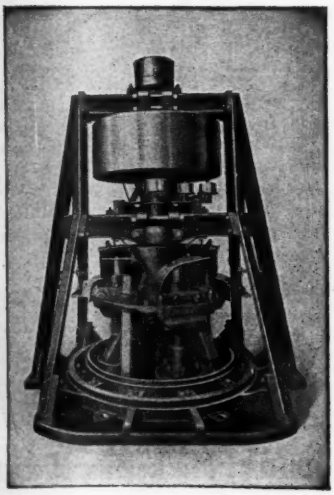

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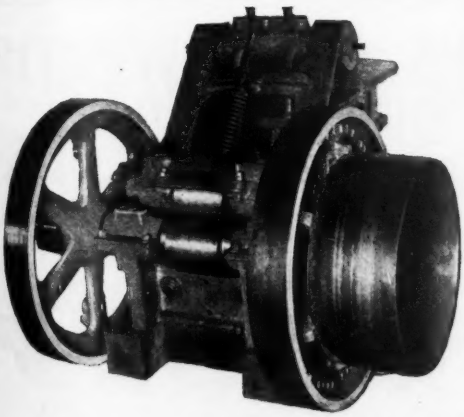

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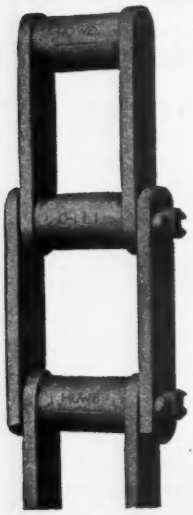

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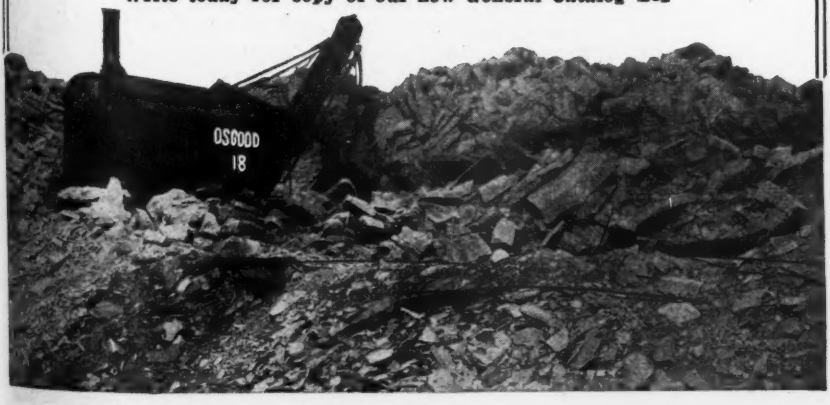

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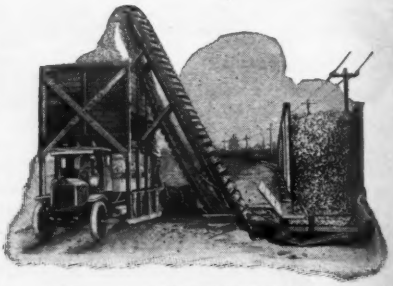

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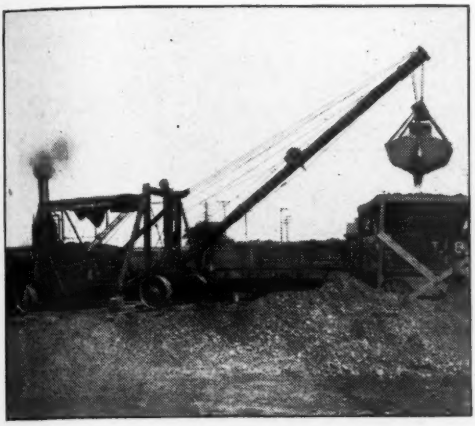

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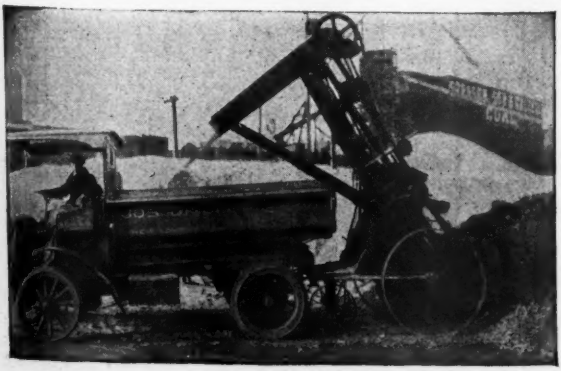

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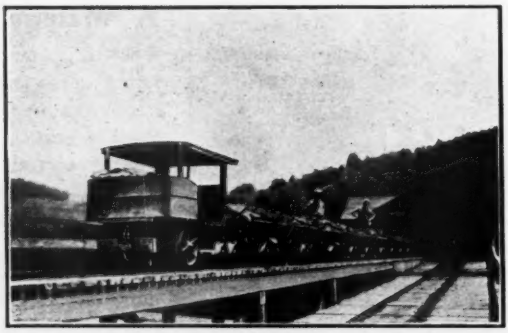

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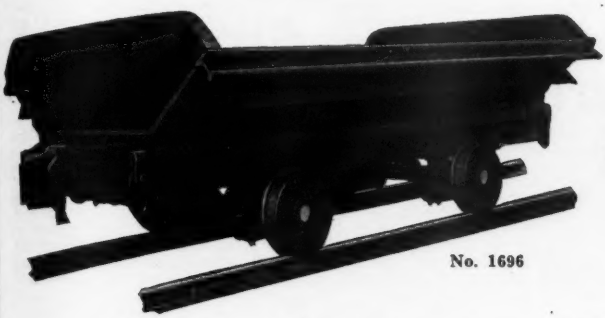

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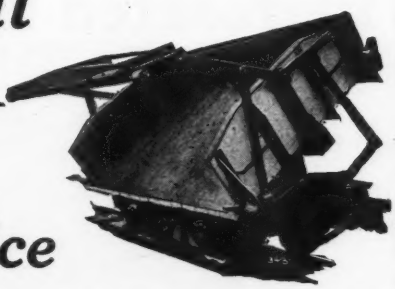

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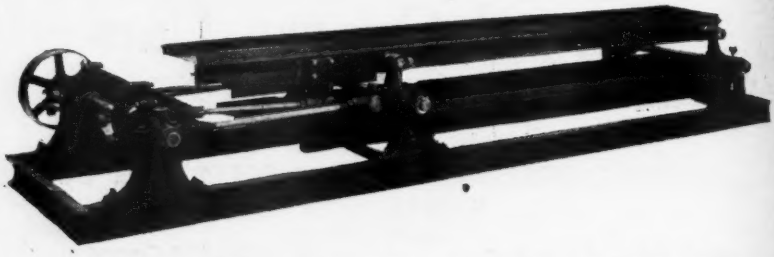

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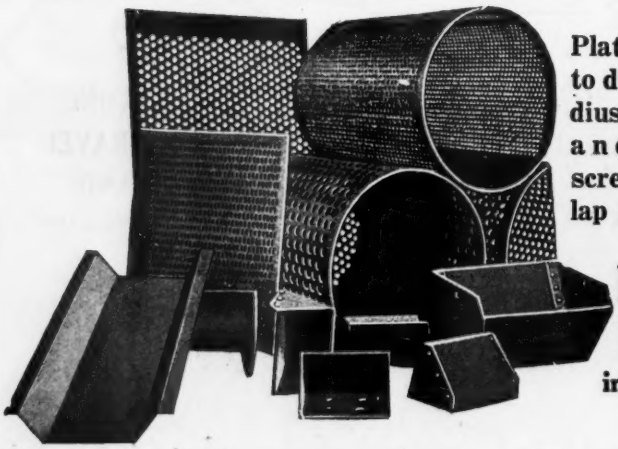
FOR STONE, SAND, GRAVEL, ETC.



Plates flat; rolled to diameter or radius for revolving and conical screens butted or lap joints.

Elevator Buckets in all styles and sizes

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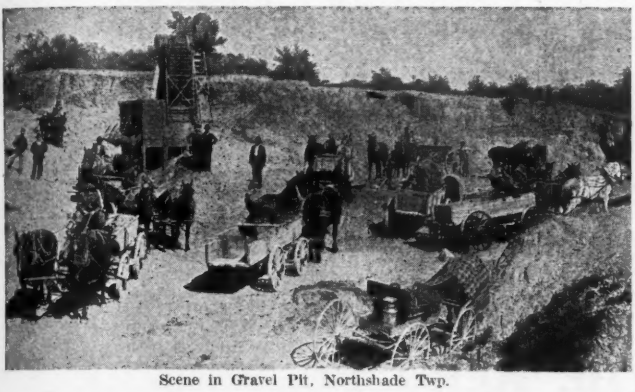
Ever-Clean Gravel Screen



Scene in Gravel Pit, Northshade Twp.

This is our first advertisement in two years because we could not make them as fast as we could sell them. Now we have a few on hand ready for immediate shipment.

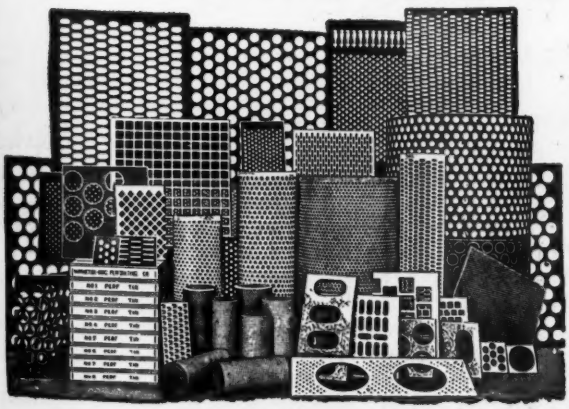
The principle is different than any other screen.

GUARANTEE It is understood the Beach Manufacturing Company guarantees this Screen to do better work than any Rotary, Vibrating, Pulsating or Shaking Screen, and to screen material that they can not successfully handle. We guarantee this Screen to produce a better grade of gravel under like conditions than any other Screen made. We guarantee the workmanship to be first-class and to replace for a period of one year any piece or part that proves defective either in workmanship or material.

Beach Manufacturing Co., - Charlotte, Mich.

Perforated Steel Screens

of Every Description



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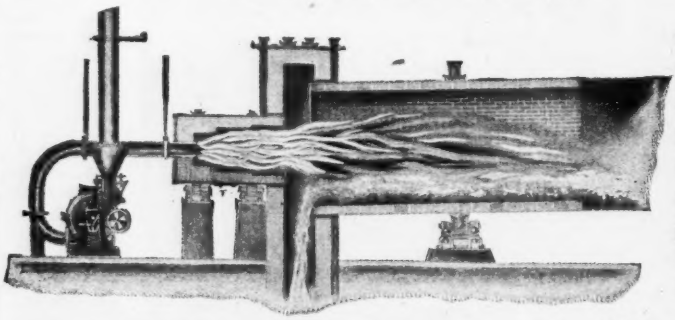
for Drying and Calcining



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Burns coal like a gas, producing at will a wide range of temperature, a flame, the physical and chemical character of which is regulable—one that may be elongated or shortened, made oxidizing, reducing or neutral as occasion may require.

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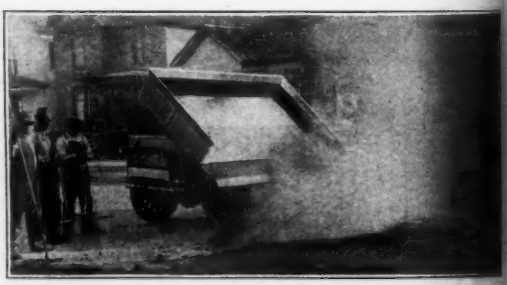
Get after the Side-Dump Body Business, and increase the output of Trucks.



Side View

with a

AUTOMATIC SIDE DUMP BODY

To increase the Sales of Trucks put on a Side Dump Body and watch your Business Grow.

Dumps in any weather.
No lost space back of driver's seat.
Can't break down and get out of order.
Will outwear any truck.
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Write for attractive Dealers' Contract.

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should be used to detonate the explosive charge wherever the well drill method of blasting is used.

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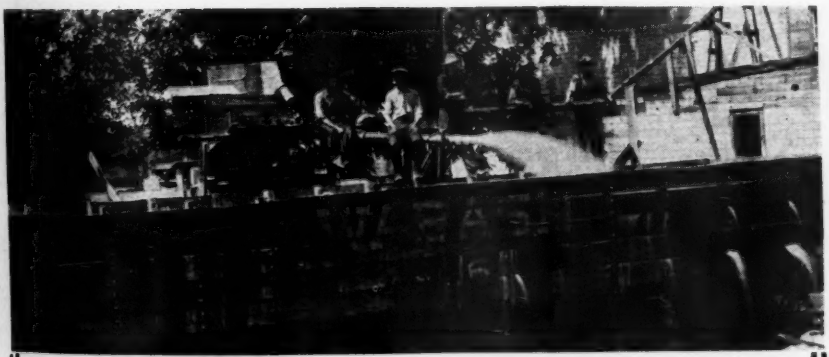

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Nye Steam Pump & Machinery Company

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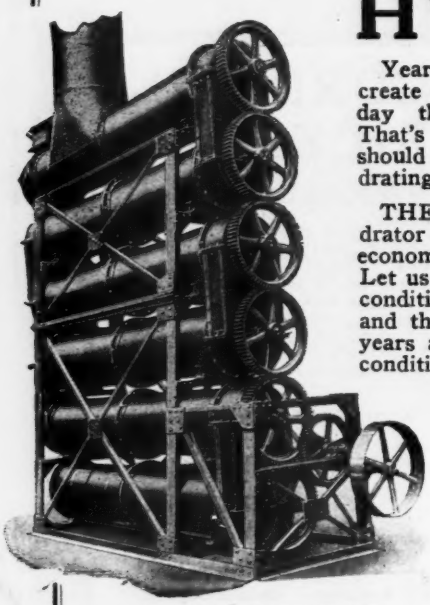

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THE KRITZER Continuous Lime Hydrator is efficient in production and economical in operation and maintenance. Let us investigate exhaustively the local conditions peculiar to your proposition, and then apply our experience of many years and design a plant to meet those conditions.

A KRITZER plant, scientifically adapted to your conditions will give you the best product at lowest cost.

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AMONG the users of Sauerman Dragline Cableway Excavators are many large tonnage gravel producers who have been compelled by the car shortage to operate their plants at far below their normal capacity.

Such a situation emphasizes the advantage of using a type of equipment that is low in operating and maintenance cost.

During this season the owners of large plants equipped with Sauerman Dragline Cableway Excavators have had an opportunity to realize more strongly than ever before the economy of these one-man operated, combined excavator-conveyors.

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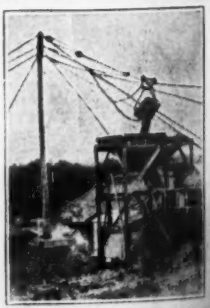

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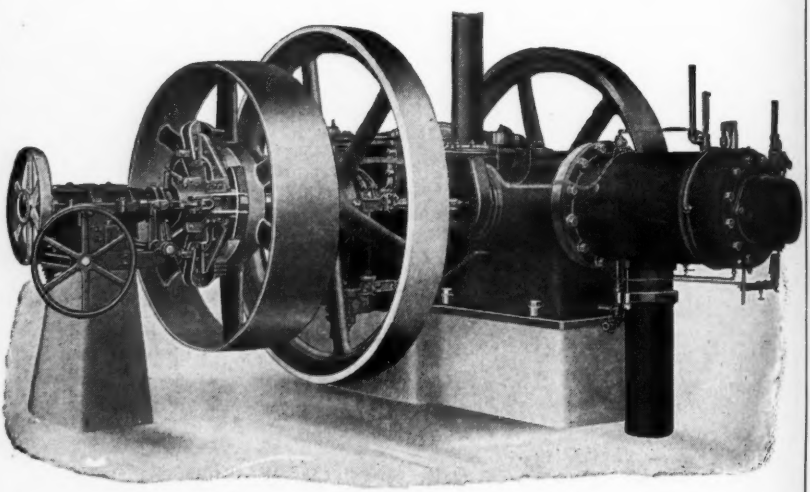

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Tell us your requirements and we will forward you interesting data on your particular plant.

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140 Pittsburgh Ave., Muncie, Indiana

The Safe Storage of Coal

By DANIEL J. HAUER

THE storage of coal at any time is a serious consideration for any company or man; and with the unsettled condition of business and more especially coal mining and freight carrying, the problem of having coal on hand for immediate and future use is of more importance than ever.

It would seem that if the problem is to be solved it must be by means of storage when coal is obtainable, so it is well to understand every phase of the safe storage of coal, as well as the methods of storing and rehandling.

There is a movement on foot for the more uniform storage of coal by consumers in order that the conditions surrounding coal mining may be improved. That is, that mining should not be done by seasons, but a regular output obtained the year 'round so that it is mined at the lowest cost of labor, and the hauling should be done in good weather instead of under the bad weather conditions of the autumn and winter, when freight hauling roads are congested with crops and other heavy hauling.

These are important considerations, as they mean that the supply of coal would be more regular and the price probably lower. These things, though are not those that will weigh as much with the consumer, as the extra cost of storing and rehandling, the danger of loss, and many other considerations.

The item of invested capital tied up in a large coal pile is considerable; yet if the coal is purchased at the proper season the cost may be so much less than during the winter, that the saving so affected may more than offset the interest on the money tied up in the coal pile. But in many cases it is not consideration of saving a few dollars or the saving of the interest on the money invested, but it is securing enough money to purchase the coal. This is a harder problem today than ever, for bankers are not willing to make loans, and with the great scarcity of coal, miners and dealers are not so keen to sell coal on long terms. The fact is that cash is frequently demanded for deliveries of coal, for in many lines of business it is an actual necessity and the seller knows he can demand cash. This is true of many quarry and pit operations.

Power plants should store coal to guard against interruptions in the supply, to maintain a reserve to last from thirty days to six months, adding to it when advisable and using coal when necessary. Fortunately for many operators in this field, pits and quarries are not run to any great extent during the winter, so that a large supply is not needed, but ample must be carried through the winter to give all the power needed in the early spring to fill orders for products that have accumulated during the closed season.

The objections to storing coal are many. Besides money being tied up in a pile, there is the cost of rehandling unless the coal is kept in pockets from which it can be fed directly under the boilers. Even this would mean the investment of considerable capital to provide such pockets; for storage facilities cost money, not only to provide but to operate.

Although there is not a loss of heating power on account of age, yet most coals are very friable, so that each rehandling is bound to produce fine coal and slack, an excessive amount of which means inefficient combustion. The finer the coal, when stored, the greater chance of loss through spontaneous combustion. Anthracite coal,

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whether of large or small size, does not heat up as do the bituminous, subbituminous and lignite coals. The last two are more subject to heating than bituminous.

Coal in large lumps is not as apt to heat as smaller sizes or fine slack coal. It is also supposed that coal low in sulphur will not heat as rapidly as one high in sulphur, yet many piles of low sulphur coal have heated to the danger point. It is also thought by some that the mixing of different grades of coal is a bad practice as it is apt to lead to spontaneous combustion. This may or may not be the case.

The cause of spontaneous combustion is supposed to be due to the oxidation of the surface of the coal, heat being thus generated. With no means of lowering the temperature or dissipating the heat it means the pile at that point, and the coal under the surface, will so increase in temperature as to start actual combustion. The warmer the weather the more apt the temperature is to increase.

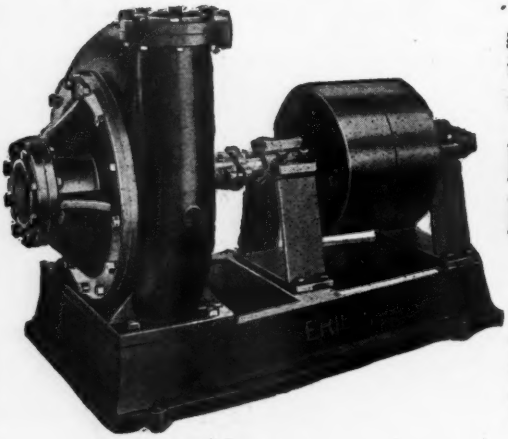
With the oxidation originating on the surface, it can be seen that with a storage pile once established the surface should be disturbed as little as possible. With the surface once heated to dump fresh coal on it, means not only to retain this heat, but the temperature is likely to rise to the danger point. To disturb the pile by cutting into it unnecessarily, when the surface has become heated, may mean to open up an air current or vent in the pile that will start combustion. A temperature of 140° Fahrenheit gives a warning, while 160° means danger.

It is possible to tell of this danger in several ways. Those accustomed to handling and storing coal may tell of the heating by the oder given off the pile. At times heating can be detected by the hands, but the safest way is to use iron rods or a thermometer. As it is necessary in most cases to disturb the surface of the pile in order to insert a thermometer, the better way is to insert long iron rods, allow them to stay until they become the same temperature as the coal, then take the temperature of the rods with a thermometer.

The easiest way to prevent heating is to take care in the storing. It makes little difference whether the coal is under cover or exposed. However, if bins or pockets are used that have air tight bottoms, the danger of spontaneous combustion is materially reduced. If piles are used the first care must be in preparing the bottom. It should be level enough or on an even grade to prevent having holes or air pockets under the pile.

No external heat should be near or brought into contact with the pile, such as steam pipes, boilers, locomotives, or other things that give off heat. See to it that nothing in the way of paper, oily waste or other highly combustible things are brought in contact with the coal. Even hot cinders from boilers and engines should be guarded against. Coal should never be piled upon trash, sticks or timbers, nor should pieces of old pipe, sticks or timbers be allowed to be mixed with the pile, as these allow vents or flues to be formed that bring together warm currents of air from below that accentuate the heating process.

Fine coal should never be stored in bulk. As much as possible, screened coal should be purchased for this purpose. If there is much fine coal, care should be exercised to have it scattered throughout the pile. Coal should never be segregated and piled according to sizes. Lumps allow air to circulate throughout the pile and keep it cool. Run of the mine coal can be stored successfully but the pile should be carefully built up in layers and should be kept low. Slacked coal can only be stored successfully under water.



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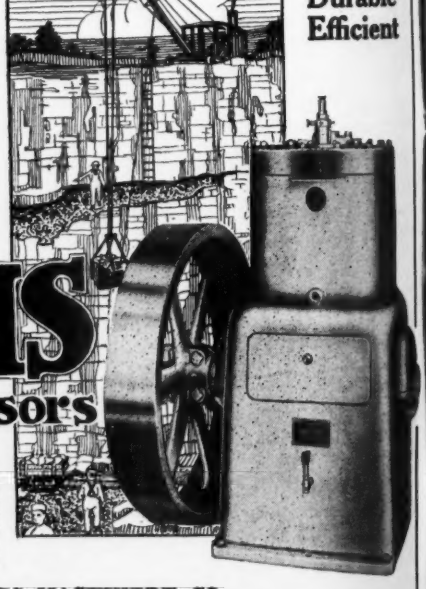

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CURTIS Air Compressors

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CURTIS PNEUMATIC MACHINERY CO.

1628 Kienlen Ave., St. Louis, Mo. Branch Office: 531-K Hudson Terminal, New York City.

Any storage pile should be watched carefully for heating. This means daily inspection, the greatest danger coming during the first hundred days, as age of coal in piles does not seem to aggravate its tendency to heating.

For the storage of a few carloads of coal, no greater precautions are necessary than those already outlined. As the amount is increased, greater knowledge should be had of coal storage and more care must be exercised. Great care must be taken to prevent breaking up the coal and to prevent segregation. Both of these will happen if the coal is dumped from a great height, especially from a trestle or into a narrow bin, as the obstruction will cause the coal to break and the fine parts is apt to collect around the legs or against the supports and readily become heated. The lumps, too, are apt to roll to the bottom of the pile at the sides. The same thing is true when the piles are made by clam-shell buckets and indiscriminate handling of the coal is done. Piles made with a huge apex or cone shaped are bound to collect the fine coal in the center, and the lumps all run to the sides at the bottom of the pile. This fine coal is apt to heat quickly.

The larger the pile the more difficult it is to watch it and the greater the danger of the coal heating, for in large piles there are apt to be a number of places where conditions are favorable to rapid heating. Then, too, the more difficult it is to move part of the pile when heating does occur.

For pit and quarry operators, when plenty of space is available for storage, it is the part of wisdom to make several piles instead of one large pile. The pile should be kept low instead of high and should be spread over a fair area and built up in layers. Never allow teams or trucks to haul over a pile as they will grind coal ito dust, thus augmenting the heating process.

If coal ignites in a pile, not only much of it will burn to an ash but a large portion of the pile will become so heated as to lose much of its heating value. Thus the burning fire must be quenched and the rest of the coal allowed to cool.

Water can be used to put out the fire and cool the coal, but the water must be made to reach that part of the pile that is heated and buring. A jet under pressure, is not apt to do this, as the fine coal resists the penetration of the water, causing it to make a loblolly of a great mass and slough off to one side without reaching the seat of the trouble. To use water successfully means to dig down into the pile and then apply the water. Steam should not be used, for it will only help to heat the coal to a higher temperature.

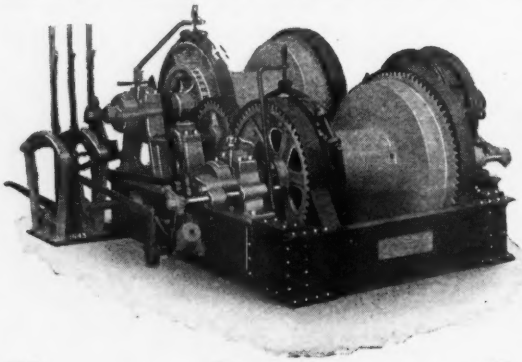
The best method of handling a burning pile is to remove that part of the pile that has become heated. The coal can be removed and separated and allowed to cool down to normal temperatures. Although it can be repiled when completely cooled, yet it is advisable to use this coal and store the new supply being received.

One more caution. Coal should never be piled so that pools of rain water or snow can gather on it, as the trickling of water through the pile is apt to close air vents and thus aid the propress of heating.

The Ogden Sand & Gravel Company, Ogden, Utah, has incorporated recently. Capital to the amount of $50,000 is authorized, with shares having a par value of $1.00 each. The officers are A. J. Walker, president, and A. W. Anderson, secretary and treasurer.

Central Hall Lime & Stone Company, Center Hall, Pa., having an authorized capital stock of $15,000, is a recent incorporation. Its organizers are Chester A. Spyker, of James Creek, Pa., F. S. Koons, Boyertown; and Irving S. Horton, Reading.

LIDGERWOOD HOISTS



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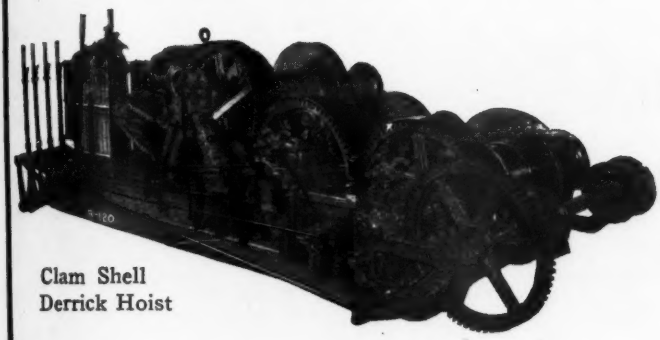

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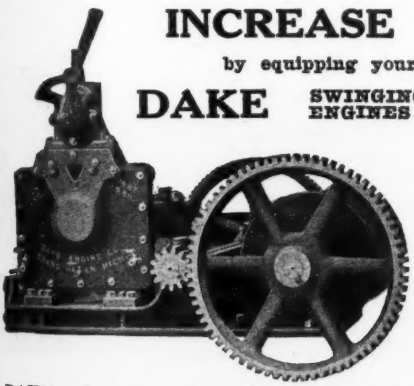

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Engines have no dead centers, but start, stop, and reverse instantly.

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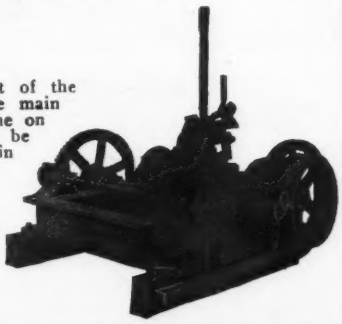

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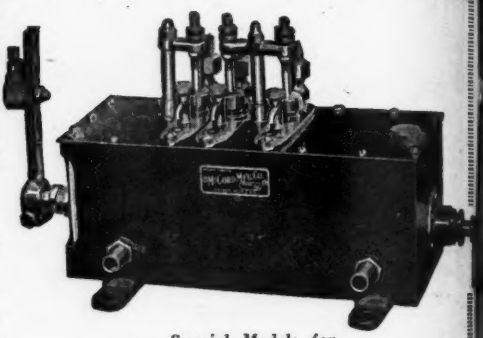

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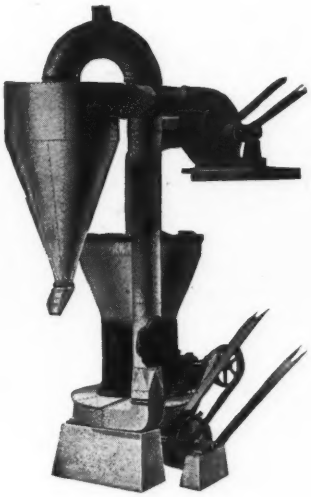

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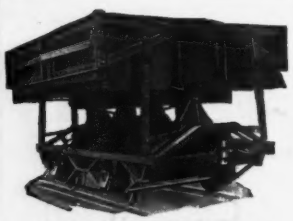

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